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STATE HATCHERY, SUTTON, MASS.

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REPORT

OF THE

Mass:

COMMISSIONERS

ON

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FISHERIES AND GAME

FOR THE

YEAR ENDING DECEMBER 31, 1902.



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CONTENTS.

REPORT.

General considerations :—	PAGE
Appropriations,	5
Expansion of the work,	6
Fish culture :—	
Appropriation,	8
Scope of the work,	9
Expansion,	10
Output of fish,	11
New method of distribution,	11
Concerning fry and fingerlings,	15
Work at the hatcheries,	18
Rearing young fish,	19
Rearing ponds, etc.,	25
Brood fish,	27
Taking trout eggs,	29
Artesian well at Hadley,	30
Purchase of land,	32
Fencing State land at Sutton hatchery,	32
Ponds stocked,	33
Ponds leased,	36
Brooks stocked and closed,	36
Rivers stocked,	36
Examination of ponds,	37
Work of the United States Fish Commission,	44
Fishways,	46
Prevention of stream pollution,	47
Pond and brook fishing,	50
Fisheries :—	
Notable features of the year,	55
Statistical returns,	59
Shore weir and net fisheries,	60
Lobster culture and lobster fishing,	67
Sea fisheries,	73
Inspection of fish,	97
Game :—	
Relation of game to public welfare,	99
Need of protective legislation,	102
Status of game,	103
Sea and shore birds,	106

Game—*concluded*.

	PAGE
Partridge, woodcock and quail,	107
Pheasants,	116
Deer,	119
The Belgian hare,	125
Squirrels and rabbits,	128
Breeding game birds and animals :—	
Winchester,	129
Pheasants,	129
Ruffed grouse, woodcock and quail,	133
Experiments with foreign game birds,	134
The Belgian hare,	134
Sutton,	135
Report of the superintendent,	135
Experiments elsewhere,	138
Distribution of game birds and animals,	140
Concerning introduction of new species,	141
Exhibit at Sportsman's Show, etc. :—	
Authorization by the Governor,	142
Scope and character of the exhibit,	142
Request to participate in agricultural fair,	147
Enforcement of laws :—	
Financial resources,	147
Force employed,	148
System adopted,	148
Result,	154
Deductions from the work,	162
New legislation,	162
Courtesies,	166

APPENDIX.

A. List of commissioners,	171
B. Distribution of food fish,	177
C. Distribution of pheasants,	182
D. Distribution of Belgian hares,	184
E. Arrests and convictions,	185
F. Legislation,	192
G. Statistics of shore fisheries,	198

Commonwealth of Massachusetts.

To His Excellency the Governor and Honorable Council.

The Commissioners on Fisheries and Game respectfully submit their thirty-seventh annual report.

GENERAL CONSIDERATIONS.

Appropriations. — The aggregate appropriations made for the conduct of the commission's work in its various branches during the current year amounted to \$24,765. At this time it is not practicable to show the amount expended, and inasmuch as this will be clearly shown in the Auditor's report, exact figures here might not be required, even if they were available.

The appropriations were divided as follows: \$4,930 for compensation of the commissioners; \$1,550 for travel and other necessary expenses of the commissioners; \$780 for clerical services; \$16,705 for enforcement of laws, the propagation and distribution of fish, birds and other animals, and for running expenses, rent, purchase of land and maintenance of hatcheries; \$500 for stocking ponds, and \$300 for stocking brooks under special acts.

As will be seen, the item of \$1,000 for erecting fishways, which formed a part of the sum allotted last year, was omitted from this year's appropriations, and this without detriment to the public service, since there would have been no occasion to draw on it had the money been available.

A most gratifying change in drafting the appropriation bill was made, whereby the sums allotted for the enforcement of law, the conduct of hatcheries, distribution of fish, and the breeding and rearing of game birds and animals were combined under one head. Inasmuch as the deputies must be called upon to distribute fish, birds and animals, or, perhaps, to

attend to various duties other than the enforcement of law, this method of making appropriations simplifies accounts, materially lessens the office work, and in other ways enables the commission to prosecute its work with greater vigor and efficiency.

The moderate and much-needed increase over the sum total of last year made practicable the accomplishment of several important objects, detailed reference to which will be made under their proper headings. The chief of these were the purchase of additional land at Sutton, the enlargement of the work of distributing fish and the sinking of an artesian well at the Hadley hatchery.

The growing appreciation of the work of the commission is strongly evidenced by the action of the Legislature, which generously complied with the recommendations in our previous report, and liberally provided the money required for an economic conduct of the various affairs which must receive attention.

The greater efficiency resulting from the proper expenditure of the additional money thus made available has not only appealed to the public in many ways, notably in the new system of distributing fish, and the vigorous enforcement of law, but has likewise led to a noteworthy enhancement of the efforts put forth by the commission in various other directions.

In this connection it may be permissible to say that the greatest care has been exercised regarding expenditure, and the strictest economy consistent with efficiency has been required in all branches of work. The controlling thought has been to secure the largest possible result from the money expended, and it is believed this ambition has been realized to a degree seldom equalled in similar official duties, with less of discouraging mishaps or errors than usually occur.

Expansion of the Work.—The determined effort to enlarge and broaden the scope of the commission's work, so happily inaugurated in recent years, has not been relaxed in any particular this year. As will appear in detail elsewhere, there has been an increase in the output of young fish, including fingerlings, and much has been done to improve the facilities for breeding and rearing fish. In other respects the

hatching stations and their surroundings have been improved or beautified.

The results of breeding and rearing game birds and animals exceed those of last year, which was far in advance of any previous record. Present plans contemplate a material increase in the output of fish, birds and animals.

The statistical work of the commission has been enhanced and improved by special effort and judicious appeals to the fishermen. The results are growing in value.

By act of the Legislature the inspection of fish has been placed under the control of the commission this year. The importance of this change, considered from an economic standpoint, may be more largely apparent in the future than now.

The commission successfully participated in the Sportsman's Show held at Mechanic's Hall, Boston, and for the first time in its history undertook to make a public illustration of its work at an exhibition.

Interesting experiments in breeding and acclimating game birds, and in holding them in captivity, have been made. Facts not previously known have been determined, and much of scientific and practical value may yet be learned as a result of the continuance of these important and instructive researches.

The co-operation and cordial relations existing between the commission and scientific institutions, notably the Museum of Comparative Zoölogy and the Institute of Technology, continue, and there is reason to hope that this may lead to satisfactory results in the future, both as regards abstract and applied science.

Correspondence has been continued with persons resident in foreign countries, with the object of benefiting our fisheries. On various occasions the chairman has addressed societies or associations regarding the fisheries and their needs, and has delivered illustrated lectures on the work of the commission. In this manner much useful information has been imparted, and no doubt the public has obtained a clearer conception of the work and purposes of the commission, and how these are liable to effect the welfare of the people in a practical manner.

Another result which may be pleasantly anticipated is that

the people have been made to understand how they can best work to benefit themselves and thereby aid in securing the objects the commission is striving to obtain.

The additions to the collection illustrating the work of the commission have unquestionably been less in number than they would have been if the facilities for their installation and care had warranted contributions. The gathering together of a collection of moderate dimensions for the instruction of those having relations with the commission, and likewise to aid in more clearly presenting facts to legislative committees, is a matter of such consequence to the proper conduct of the work the commissioners are charged with doing, that it is most earnestly hoped the day is not far distant, when, at least, it will be possible to receive and properly care for the material that is freely given it, or that may be gathered by those connected with the commission. When it is stated, without fear of successful refutation, that no fish and game commission ever constituted, in this State or elsewhere, can do the best work possible without some tangible representations of the objects and materials it has to deal with, it will be seen that there is ample reason for the hope expressed. It is true much has been accomplished and more may yet be done, but it is important to consider the question whether it is desirable to be content with less than the welfare of the service demands, especially if little else is required than facilities for caring for such material as may be brought together.

FISH CULTURE.

Appropriation. — As has been indicated in the preceding paragraphs, no specific appropriation was made this year for fish-cultural work, nor can such an assignment of funds be made specifically without detriment to the service. Owing, however, to the system adopted of preparing an unofficial, detailed itemized estimate of the money required for the various purposes connected with the prosecution of fish culture, it is not difficult to state the aggregate amount appropriated for the conduct and increase of this work. The total amounted to \$6,335. Of this amount, \$500 was for stocking ponds, under a special act, and \$300 for stocking brooks under a similar

provision of law. It should likewise be noted that \$1,000 was for the purpose of enabling the commission to distribute fish, birds and animals bred by it, so as to relieve applicants from the expense and trouble of going for them; \$600 was for sinking an artesian well at Hadley and provision was made for the purchase of land at Sutton, for which \$225 have been expended.

Special reference has been made to the last three items for the reason that they are new features in the appropriation for fish culture, two of them made necessary by conditions at the hatcheries and the other by the reasonable demand of the public for consideration which might appropriately have been given at an earlier date.

The special appropriation for stocking brooks was made \$200 less than it was last year for the very excellent reason that it was not anticipated more than \$300 would be required to carry out the purposes of the act (section 5, chapter 91 of the Revised Laws). This conclusion has been justified by the result.

While of course the intimate relation between fish culture and other branches of the commission's work would make difficult any attempt at precise differentiation of expenditure, the figures given are sufficient for a very close approximation to the actual cost of this particular work. At the same time it is but just to say that the sinking of a well and the purchase of land are extraordinary charges, for the permanent improvement of the hatcheries, in order that they may meet the requirements of public demand, and these items may not properly be included in the ordinary running expenses demanded solely for fish-cultural effort.

Scope of the Work.—The term fish culture, as used for the purposes of this report, is intended to embrace not only fish culture proper,—the breeding, rearing and distribution of fish,—but various other matters more or less closely allied thereto, all of which have an important bearing on the attempt to conserve or increase the supply of fish in State waters. Thus the examination of ponds, the sinking of a well, or the purchase of land to enlarge the possibilities of hatcheries, deserve consideration; while the establishment of fishways and the prevention of pollution of streams are included under

this head because of their influence on the abundance of fish, although, as a matter of fact, orders compelling the construction of fishways or prohibiting the discharge of sawdust into streams are, strictly speaking, acts connected with the enforcement of law.

Thus the work dealt with under this head covers a wide range of effort, especially when mention is very properly made of the important results attained at the hatcheries of the United States Fish Commission located in this State.

Expansion. — Although there has been one notable disappointment this year in the fish-cultural work, due to no preventable cause, so far as the commission is concerned,* and while anticipations have not been fully realized at Hadley, despite the determined and well-directed effort made, the general result has been a most gratifying increase in the output of fish, amounting to fully 100 per cent., or more, above that of last year, which was a record at that time.

Partial success was attained at Hadley in rearing fingerlings, and expansion in various other ways has characterized the work at that station, as well as elsewhere, as will be shown in more detail under other heads. But the work of the year was no more remarkable for the increased output than it was for new lines of application of effort and the preparation for still larger advancement in the future.

With the increased possibilities resulting from a hoped-for betterment of conditions at Hadley; the assurance of a continuous water supply at Sutton from land now owned by the State; with an increased number of breeding trout of several varieties now becoming available; with anticipation of soon being able to collect eggs from landlocked salmon raised at our hatcheries, and with the prospect of continued appropriations for the satisfactory distribution of fish, there is reason for gratification with what has thus far been accomplished, as well as cause for hope that the immediate future may see an enlargement of the work commensurate with the needs of the State, and as a proper result of the plans that have been carried through for that purpose.

* Reference is made to the failure to obtain pike perch eggs from the United States Fish Commission, mention of which is made elsewhere.

Output of Fish. — The most important incident in the distribution of fish, considered from the stand-point of numbers as well as an innovation in the fish-cultural work of the commission, was the planting of 6,000,000 shad fry in the head waters of rivers of this State. The first lot of 3,000,000 was put into Assawompsett Pond, the source of Taunton Great River, on May 24, 1902, and four days later 3,000,000 more were planted in Furnace Pond, the head waters of North River.

These consignments were received from the United States Fish Commission, by one of its cars, and the fry were in excellent condition when planted.

The trout fry put out in the spring numbered 1,010,000. This is a record on trout fry, and exceeds the output of last year by nearly 16 per cent. In addition to these plants 4,000 yearling and 65,000 fingerling brook trout, and 1,000 brown trout fingerlings have been put into the streams, while 6,500 rainbow trout fingerlings, 1,000 landlocked salmon fingerlings, 125 adult brook trout and 2,750 white perch have been used to stock ponds,* while 8,500 brook trout fingerlings have been reserved to increase the brood stock.

This brings the total output to 7,091,375, and the fact that so many of the salmonidæ species were either fingerlings or yearlings when put into State waters gives a larger importance to this work than the figures would seem to indicate.

When considering the output of fish mention may properly be made of the distribution of large quantities of landlocked smelt eggs in various ponds and lakes. Thus other thousands of fish have been added to the interior waters.

New Method of Distribution. — There is occasion for gratification that the recommendation made by the commission in its last report, concerning the need of a change in the method of distributing fish, met with prompt appreciation of the public and the Legislature. As a consequence the sum of \$1,000 was added to the general appropriation to meet the necessary expense of shipping the fish to applicants, and sending a special messenger with each consignment. Thus the fish are taken from the hatcheries by the messengers of the com-

* In addition 350,000 landlocked smelt eggs were planted in ponds.

mission (who are usually the deputies ordinarily employed in the enforcement of law), and delivered to applicants at the railroad stations in their respective localities, or they are deposited by the messengers in the waters to be stocked.

The ideal way would be for each messenger to take the fish in his care to the stream or pond they are intended for and deposit them himself. This is almost invariably done in the case of ponds, but it often happens that shipments of fry or fingerlings are assigned to one town or city to stock several streams, which may be more or less widely separated. It is a matter of economy to make all these shipments at one time and thus limit expenses of railroad travel, team hire, etc., but it is manifestly impracticable for a messenger to do more than to take the fish to the town or city they are destined for and turn them over to the several applicants. Aside from this he may go with one lot and put them into the water, but to attempt anything beyond this would result in a large increase of cost or a probable great loss of fish, since it is evident that some of the fish would die if left at the stations while the messenger was engaged in planting other lots.

The problem is not a simple one, if satisfactory results are to be obtained with a moderate outlay, and the commission has given much thought to it.

On the whole, the plan adopted has worked well, and with slight modification another year, which has already been provided for, together with the increased experience gained by the deputies, the most satisfactory results may be anticipated.

Previous to this year it has been customary for applicants for fish to be compelled to go after them, upon notification, and those living at long distances from the hatcheries were subjected to considerable expense, loss of time and possible interference with business, in the effort to secure fry or fingerlings for stocking public waters, in which others had as much right to fish as they had.

While instances of this kind, which were numerous, indicated an enthusiasm and self-sacrificing public spirit which might be commended, the actual result was that the effort to keep the streams stocked bore too heavily upon a few individuals. This fact was modified in no particular because the work performed

was done uncomplainingly and frequently with great thankfulness that the fish could be secured from the State, even with the unavoidable trouble and personal sacrifice connected therewith. But, aside from the inequality of such a system, which laid burdens upon some that others did not have to bear, or at most felt them to a less degree, the results of this method of stocking the inland waters were sometimes disappointing or even discouraging. The method was crude, naturally it could not always command experience, and the best that can be said of it is that it was born of necessity. The commission did the best it could while compelled to continue it, but was glad to improve the opportunity given it to adopt a better and more satisfactory plan to carry out the beneficent purposes of the State.

The present method is to notify applicants in advance that fish will be sent them in the near future by special messenger, and each person who is to receive fish is instructed, upon notification from the messenger, to meet him at the railroad station specified, on the arrival of the train indicated in the messenger's notification. If, however, fry or fingerlings are taken by other transportation facilities, such as a team, for instance, that is mentioned in the notices sent, and the particular time and place where the messenger can be met are indicated. In all cases the co-operation of the applicant (personally or by deputy) is sought, even when a messenger can take the fish to the waters they are intended for. This usually prevents possible errors in planting fish, especially when a messenger is unfamiliar with a locality,* and inasmuch as most applicants are glad to provide teams for transferring the cans from stations they arrive at to the localities where the fish must go, additional cost to the State is thus often obviated. Beside this most applicants are glad to participate in this work and see for themselves the fish put into the streams or ponds.

In all cases the messenger is furnished with a list of the addresses of those to whom he is to take fry or fingerlings, and he is instructed to notify each person in advance, by wire or

* It is evidently too much to expect that the deputies shall be thoroughly familiar at the start with every locality and every brook in the State, for comprehensive knowledge of this kind can only be acquired by experience and a wide range of work of this kind.

postal, of the time when he will arrive at the place of meeting, whether he goes by train or other means of conveyance. This notification also generally carries with it a request that the person to whom the fish will be taken will have in readiness a team capable of transporting a specified number of fish cans. If the messenger thinks ice will be needed on his arrival, that also can be included in his request.

Most of the applicants know something about moving fish, and therefore are generally able to intelligently provide for their transportation by team, if they know the number of cans to be carried. They likewise know why ice is required, if it is asked for, and being familiar with local conditions can secure it without loss of time. Thus they can assist materially to provide against disaster which might result from delay.

The chief obstacle met with in carrying out this method was due to the fact that the extreme pressure of other matters prevented the early despatch of the preliminary fall notices for the distribution of fingerlings. In a few cases the parties to whom notices were sent chanced to be absent; in some instances the applicants were not residents of the localities where the fish were to go, and for some other reasons the parties interested failed to receive notification until after their allotments of fish had been sent to them. In consequence of this the messengers, in a few instances, were not met as they expected to be, and failing to receive co-operation did the best they could to carry out the purposes of the commission. Whenever practicable the waters named in the application were stocked, but when this could not be done the best disposition possible was made of the fish.

The spring distribution of fry was made very successfully, substantially without a hitch of any kind, and the few obstacles met with in the fall distribution of fingerlings served a useful purpose, to the extent that they suggested desirable changes which were promptly taken to prevent a recurrence of them.

No further trouble of any kind is anticipated in carrying on this work, and the many commendations on the new method of distribution that have come to the commission from all over the State indicate the unmistakable popularity of this innovation. There is a temptation to quote many of these, especially as they

refer to an important improvement, in the effort being made to replenish fish life in the interior waters of the State, but the desire for conciseness does not admit of this. The two following brief extracts must serve as examples of many other similar statements received.

Hon. John H. Casey, Lee, Mass., in acknowledging receipt of fingerling trout sent to him October 28, writes as follows :—

The young trout sent are of good size, and are very vigorous. The unanimous opinion of the several gentlemen who saw the fish is that the method of handling and distributing is correct.

Mr. Isaac D. Pope of Danvers, acknowledging receipt of fingerling trout on October 31, made the following comments :—

The fish were received at station from 11.34 train in excellent condition. I had them placed in the stream at 12.15. Every one was alive and all conditions seem favorable for good results.

Concerning Fry and Fingerlings.—The question of the relative advantage of planting fry or fingerlings, in stocking inland waters with trout or landlocked salmon, has ever been a mooted one, concerning which eminent fish culturists have radically disagreed. Forcible arguments have been presented by the advocates of both systems, but, as a matter of fact, the leading men engaged in fish culture to-day have adopted in practice a method which embodies both of the systems alluded to. That is, they have found it most conducive to success to plant both fry and fingerlings. This applies more specifically to trout, for there are some species, the pike perch, for instance, which, because of its early developed cannibalistic tendencies, must be put out in the fry stage only.

For various reasons it is not practicable for the State hatcheries to furnish sufficient trout fingerlings to adequately stock all the brooks for which applications are received. It is comparatively easy to produce fry and bring them to the feeding stage, or about an inch in length, which they must reach before being sent out. If care is then exercised in planting them, and they are put into the head waters of the streams, which should be the rivulets tributary to the brooks

to be stocked, success may be anticipated. The fry, however, should not be dumped into a rivulet in a bunch; they should be scattered along thinly, so that the food supply available to them will not be quickly exhausted, as might be the case if they are massed together. Baby trout require food as much as any other animal that must develop vigor and growth, and this should be considered. A supply of suitable food occurs in the head waters of brooks, if the fish are not bunched too much; beside, they are in less danger from enemies there. When they grow larger and stronger and more food is required, nature has taught them to drop down to where the brook is deeper and broader, and where the species they need for food occur in greater abundance.

Some excellent results have been obtained within the past three years from planting fry, when care and intelligence were exercised in the work. Nevertheless, because it is practicable to raise a limited number of fry to fingerlings at the hatcheries, with comparatively less loss than occurs to fry put into the brooks, and because experience shows that fingerlings have many more chances in the battle of life in the streams than fry have, it is deemed desirable and important that a part of the fish used to stock the inland waters should be raised to fingerlings.

The fry are usually distributed in April, while the fingerlings are planted in October and November.

In stocking with fingerlings less attention is given to putting them at the head waters of the streams. Indeed, it is usually better not to put them too high up for various reasons. A cold snap might quickly freeze a tiny rivulet and thus destroy the fish before they found time to drop down stream; while the food possibilities there would scarcely be adequate in the fall, if at any time, for fingerlings. For these and other reasons it is advisable to distribute them thinly farther down the brook, especially where there seem to be good places for them to hide, since the opportunity to hide from enemies, among which may be reckoned larger trout, is of as much consequence to their existence as the obtainment of food.

Less care in distribution can be exercised in stocking ponds, and probably less is required, especially when fingerlings are

used, as is always the case in this State when ponds are stocked with trout or landlocked salmon. There the boundaries are not so restricted; there is larger opportunity to scatter, greater resource in the way of food supply and wider range for escape from enemies, although the chances for hiding are more restricted as a rule.

Although fingerling trout are all one age when distributed, being about eight months old, there is a wide variation in size, which may range from not more than two and a half inches to six inches or more in length. The average length approximates four inches, — about a finger's length, — hence the name fingerling. Fish hatched at the same time from a lot of eggs taken on the same day will differ, some developing much faster than others. It is a race for life; the strong, active fish crowd aside the weaklings, and, as growth depends on food, the disparity in size and strength increases with passing weeks. Here the fish culturist must interfere to prohibit the continuance of this robbery or the more fatal result of cannibalism. He therefore separates the fish according to size, putting the larger and stronger together, then those of medium size and lastly those that are smallest. This not only saves the small fish from being eaten by the larger ones, but enables them to grow more rapidly. Some fish breeders claim that when trout six months old have been thus separated, and the small ones properly fed, they have grown so rapidly that they reached the same size as the largest when yearlings. This emphasizes the importance of classification of young trout or salmon, according to size, as well as care in feeding them, and incidentally indicates the value of the tub system, by which separation can be easily arranged.

Just how far, in point of numbers, it is practicable to go in rearing fingerlings with our present facilities, it is not easy to say at this time, since so much depends on the water obtainable in summer from the well recently sunk at Hadley. In any event too much should not be expected. For, while we have practically demonstrated the feasibility of raising fingerlings by the tub system, with only a fraction of the water per thousand fish deemed requisite by competent fish culturists, nevertheless, the available flow of water at Hadley and Sutton

is so restricted, even at the best, as to fix a limit on the possibilities of rearing fish.

It is true that better results may be anticipated from the planting of fingerlings than from the planting of fry, if the numbers come anywhere near approximation, but there is undoubtedly an exaggerated idea of the relative value in the public mind, and a consequent misconception of what should be done. Let it be said that probably the best results can be secured by planting both fry and fingerlings, but generally the increase of fish in the streams will depend more on the care observed in distributing the fish, and especially the fry, than on anything else.

Work at the Hatcheries. — At no time has the work at the hatcheries been prosecuted with greater energy or success. Inasmuch, however, as this chapter deals solely with fish culture, mention of what has been accomplished at Winchester and Sutton in breeding and rearing birds and rabbits will be omitted here, and the reader is referred to the special discussion of that particular subject which appears in detail elsewhere. Aside from some improvement in the water supply at Winchester, due to cleaning out the pipes, etc., and a possible slight accession to the number of eggs incubated at Adams, there has been no material change or improvement at either the Adams or Winchester hatcheries, unless the covering of the well at Winchester may be accounted such. This item of repair was much needed, not only for the betterment of the property used for fish-cultural purposes, but also that all accessories of the hatchery should harmonize with the beauty of the Middlesex Fells, where the building is located.

Much has been done at Sutton to perfect and improve the pond and tub systems for rearing fry to fingerlings and to insure the healthy condition of the brood fish, mention of which appears in detail under other heads. New floor sills and floor were put into the hatchery, the condition of the old timbers and floor making this change imperative. The building was further improved by removing the posts that supported the ceiling and suspending the latter to the rafters. The meat house was sheathed and painted inside.

The jar-hatching capacity at Sutton and Hadley has been

doubled in the current year, so that it is now possible to place in incubation a large number of eggs of those species for the hatching of which jars are required.

A large hen house has been built at Sutton for the accommodation of the hens and bantams required in breeding and rearing pheasants.

The grounds about the hatchery and residence at Sutton have been materially improved by removing stumps, grading the land, widening and grading the road, seeding down, etc. Aside from the advantage of beautifying the grounds and thus making them attractive, it is necessary to improve them in order that they may be utilized for raising material necessary for feeding pheasants and hens, both of which require green food and the seeds from flowers, etc.

In addition to all this the underbrush has been cleared out beneath the trees, the dead or dying trees have been cut and utilized for lumber, and various other things have been done at the Sutton station to improve the conditions there and make it better adapted to the purposes for which it is used. Much still remains to be done to bring the station to that degree of fitness and equipment which is consistent with the needs of such a place, if it is to be a credit to the State and is to accomplish the work that may be expected of it. The present plan is to gradually make such changes as can be effected with the utmost economy, by having the work done almost exclusively by the hatchery force. But, while this may be economical from the stand-point of present expenditure of money, it is, perhaps, an open question whether it would not be as wise to complete all necessary improvements promptly, and thus begin to derive the benefits from them at an earlier date than is possible by the slower process.

Rearing Young Fish. — The work included under this head has been prosecuted on a larger scale this year than ever before. While discouraging obstacles have been met with, due chiefly to the conditions at Hadley, to which extended reference was made in our last report, the general result has been gratifying to the extent that it has been a distinct advance upon anything heretofore accomplished.

The experience at Hadley would have been as disheartening

as that of last year, or even worse, had reliance been placed solely on the brook water which supplied the tub system. While the temperature of this water was not generally high enough to be considered a serious menace to the existence of fry, and especially the rainbow trout fry, it was, nevertheless, subject to fluctuations when sudden rains or warm days occurred, and to that extent was dangerous to young trout, although it has been noticeable that trout thrive in it remarkably well after they have passed the yearling stage. The effect on the young trout was the appearance of a gill disease which soon proved fatal. The gills became inflamed and badly swollen; the eyes bulged, as a rule; the fish apparently ceased to feed; they gradually grew thin and after a few days died.

Last year the brook trout and brown trout suffered most from this disease; practically all of them at Hadley succumbed to it, but the rainbow trout did better, and, in consequence, it was thought no serious trouble would probably be met with in raising them to fingerlings in the rapidly running and well-aerated brook water. The experience this year, however, has shown that this conclusion was too hastily arrived at, for the mortality to the rainbow trout fry at Hadley was as severe as that experienced by the brook trout and brown trout fry left in the tub system. Practically none survived in the tubs. The lesson learned was that it is unsafe to risk trout fry of any species in the pools or tubs supplied with brook water; to do so is to invite disaster and the attendant work and worry.

The attempt to raise fingerlings at Hadley would have been almost an utter failure, despite fish-cultural skill and continuous labors of the superintendent, except for one of the artificial ponds which is fed by springs and one or more small pools similarly supplied with water. The latter did not, however, cut much of a figure, owing to small dimensions and the very limited amount of flowing water, hence we relied almost wholly on the larger artificial pool. This, as well as every other suitable place, was utilized exclusively for rearing brook trout, since it was deemed most important to have as many fingerlings of this species as possible.

The fry seemed to do well in this pond, where they gathered



PONDS AT HADLEY FISH HATCHING STATION. — Artificial rearing ponds in foreground. One on left fed partly by springs.

under the floating screens, or about the pipes from which the spring water flowed. But as the season advanced and the fish grew larger it was observed that there was a gradual diminution, noticeable almost from day to day, and this seemed unexplainable for the reason that very few dead trout were seen on the bottom, and there were few or no indications of weakness or sickness among the fish. Because there was no other water into which the trout could be put, even temporarily, it was not practicable to draw the pond and thus make a search for the supposed destructive agency, whatever it might be. The only thing was to wait until the distribution of fingerlings in the fall, when, of course, the pond could be drawn down and the cause of decimation could be sought for.

This was done, when it was found that the destruction had undoubtedly been caused by a number of the young trout which had grown to an abnormal size for their age, due to an early start in life, and thereafter gratifying their cannibalistic instincts by preying upon their weaker brethren. These large trout lay hidden under the banks of the pool, and it was evident they had for weeks or months been in the habit of darting forth from these lairs to capture the smaller fry, which they must have preferred to the food supplied to them by the superintendent. It is probably due to this, and the fact that they seldom or never appeared at feeding time, that their remarkable growth was not noticed earlier, or otherwise the gradual diminution of their companions could sooner have been accounted for and the marauders might have been removed.

This experience has led to a change in the pond, which has been divided by screens into four nearly equal sections. It will, therefore, be feasible another season to separate the trout, from time to time, into groups according to size, and thus prevent a repetition of the destruction caused by cannibalism this year. By this arrangement the output of fingerlings from this pool, which aggregated several thousands this year, despite the conditions mentioned, may be multiplied several times in the future. And if a supply of spring water should ever be available through the summer from the artesian well, sufficient to furnish a tub system, the outlook for future work at Hadley will be more hopeful and encouraging than it has heretofore

been, even though the promise of making a first-class station of it is not so flattering as it might be. Unfortunately, the flow from the artesian well does not exceed twelve gallons per minute, which is too limited to amount to much in supplying water to a tub system. It may help a little but is decidedly inadequate for the needs of the station.

At Sutton the success met with in rearing trout and landlocked salmon to fingerlings has been most gratifying, despite attacks of disease in the fall, and there is reason for believing that, considering the limited supply of water available, it has exceeded anything accomplished elsewhere, whether in the private hatcheries of this State or in public hatcheries in other sections of the country.

The tub system has continued to give the most gratifying results, exceeding those secured by other methods. Aside from other advantages of the tub system which have been mentioned in previous reports, it makes impossible such dire results from cannibalistic tendencies of trout as were experienced at Hadley. While improvements in this system are no doubt practicable, and while other provision may be made at Sutton to enlarge or make better the facilities for rearing fingerlings or yearlings, the fact remains that the conditions there are so nearly satisfactory that radical changes can scarcely be looked for, although advantage will be taken of every opportunity for advancement.

The following interesting details concerning the rearing of fish at Sutton have been furnished by Superintendent Arthur Merrill: —

Three hundred and ten thousand brook trout fry were distributed in April and May. This left 150,000 brook trout fry, and beside these there were in the aggregate 57,000 fry of landlocked salmon, rainbow trout and brown trout. Thus there were 207,000 fry as a stock for rearing. The work was attended with varying results, but on the whole it showed a decided gain over the previous year.

The rainbow trout, brown trout and landlocked salmon — species suited to water of varying temperature — were kept in the tubs and pens below the dam. The brook trout, which require the purest water of uniform temperature, were put into tubs and ponds that received a supply of water direct from the springs.

The small lot of rainbow trout eggs taken at the Sutton station in February produced very weak fry, and few of these fish survived until fall. The rainbow fry in the larger lot were strong and vigorous at all times, until late in September, when repeated attacks of disease reduced the number of fingerlings of this species from 11,000 to 6,500. The latter number was distributed.

The brown trout hatched well, but the fry grew slowly, and there was a continuous loss of feeble ones in the tubs up to the time of distribution. A small lot in one of the pens supplied with pond water developed much better and were healthy at all times. In all 1,000 fingerlings of this species were distributed.

The landlocked salmon were an unusually vigorous lot, for more than 8,000* survived until nearly the season for distribution. On September 28, however, they were seized with an epidemic which destroyed about one-half the lot. This attack was speedily checked, but others followed, constantly reducing the numbers, until only 2,000 healthy fish of this species were left for distribution.

The brook trout did well in all of the tubs and ponds except two, where they were somewhat sickly, but the loss was slight. In the upper tubs the number raised to fingerling size was 30,000, an increase over last year of 50 per cent. More than 10,000 were taken from the upper pond (or pool) where last year less than 6,000 were obtained. The total product of fingerling brook trout was fully 70,000, an increase over 1901 of about 18,000 fish. Add to this the other species of trout and landlocked salmon, and the aggregate result of rearing fingerlings at the Sutton station this year is nearly 80,000.

The fish did not suffer severely through the summer from attacks of disease, and on one occasion only were threatened with serious loss. This was when a parasitic fungus developed in the gills of the salmon. A cure of this was effected, however, before much loss occurred, and the chief damage sustained was seen in the weakened condition of some of the fish, — a condition most noticeable in two of the tubs. It was a recurrence of this disease that caused the severe mortality in September, as well as some loss of rainbow trout, and its virulence then was doubtless due to the poor quality of the water at that time. Aside from the disease the unsatisfactory condition of the water caused much weakness in the fish, and this combined to make the loss much heavier than is common from such attacks.

Salt baths was the remedy applied in these cases. In the early attack a single application effected a cure. In the later instances

* This lot was hatched from 10,000 eggs.

marked improvement followed each treatment, but the effect was not lasting.

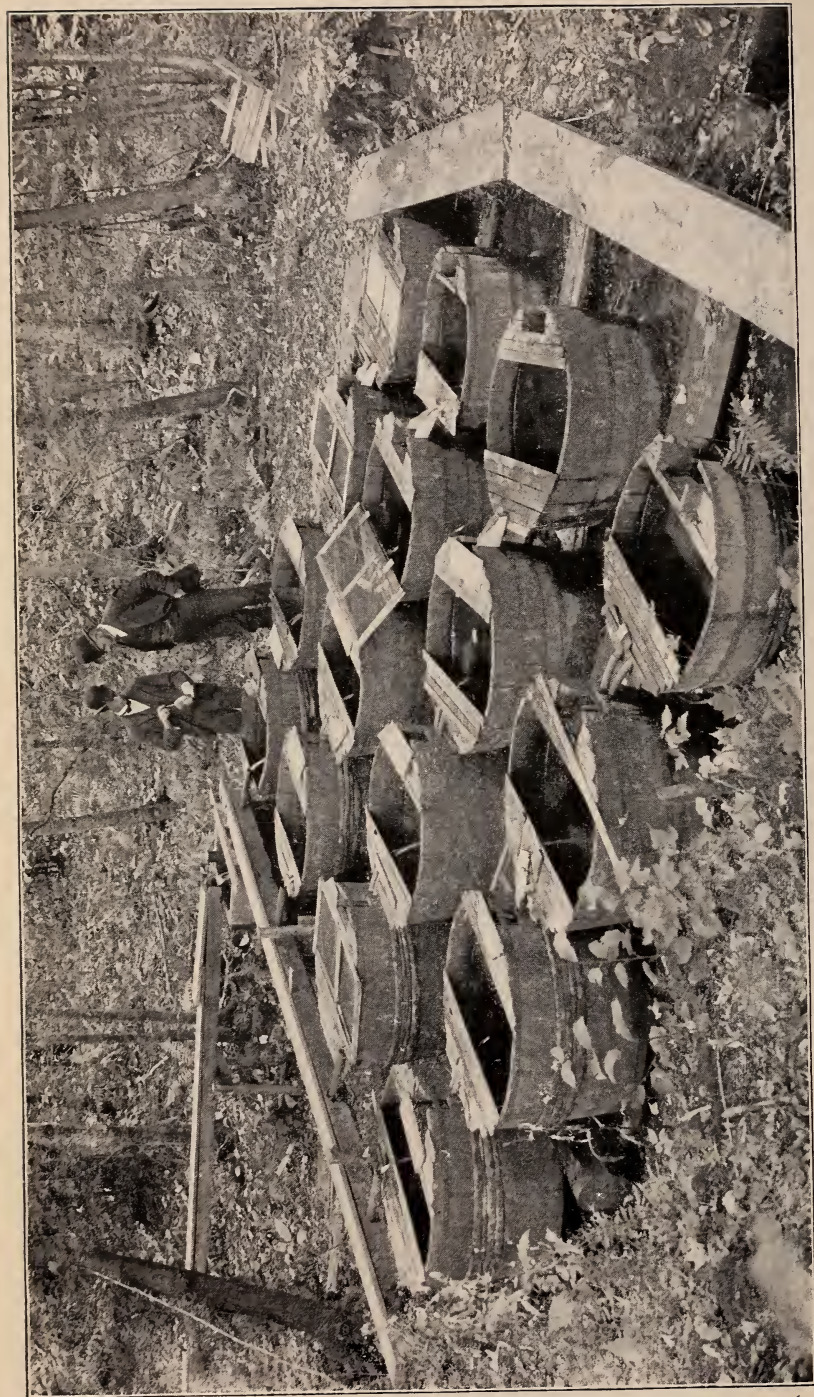
Other diseases caused small losses. The fungus known as "fish mold" appeared on brook trout moved from the upper to the lower tubs and destroyed the whole of them, although trout had been so changed in previous years without any appearance of disease.

Many rainbow trout died during and after the gill trouble prevailed, and their condition suggested an unknown disease.

Among the fish below the dam fungus threatens to become more troublesome as the stock is increased in the brood pond and its tributary springs, for the consequent deterioration of the water that flows into the tub and pen systems below the dam increases the liability to attack and weakens the resistance of the fish. It is not possible to entirely avoid fungus on young fish by merely having a pure water supply, for the fungus spores can generally be found in water suitable for fish-cultural purposes. Immunity from attacks must be sought chiefly through keeping the fish in a strong, healthy condition, and this depends largely on the purity and proper temperature of the water. At its source the water here has all the requisite qualities for growing vigorous, healthy fish, but when it reaches the dam it has been used to such an extent for the upper lots of fingerlings and yearlings, as well as the large stock of brood fish in the pond, that its vitalizing forces are materially reduced, and its character is so changed when it reaches the lower groups of tubs and pens that there is constant danger from its weakening effect and the probability that it will promote disease. Measures have been taken to secure an improved water supply from the dam by extending the intake into the pond, and additional efforts are needed to secure greater purity and a more equable temperature.

Additional and irritating losses, amounting to considerable in the aggregate, were caused by the depredations of various enemies to fish, such as fish-eating birds, snakes, etc. The efforts to keep these enemies in check were attended with good results, but constant vigilance was required, and even this could not prevent visitations to the ponds and consequent loss of fish. Ten large snakes were killed; 12 herons and 27 kingfishers were trapped or shot (many only after persistent hunting), and other foes of less consequence were destroyed.

An unknown enemy, probably some water-frequenting insect, visited the upper tubs very persistently and destroyed hundreds of trout. Covers were fitted to the tubs to protect the fish, but these proved ineffective until all holes that would admit an insect as large as a house fly were closed. And even then the loss continued in



THE "TUB SYSTEM" AT THE SUTTON HATCHERY. — Examining young trout.

some tubs, showing that the destructive invader was very small. All efforts to discover what this enemy was failed, although trapping was tried as well as watching the tubs night and day.

The fingerlings were as good as usual in size and condition. In ponds where large numbers were reared, and crowding resulted, the fish were under the average size, but the gain in size in the tubs and some of the other pools offset this and brought the average up to a good standard.

The trout were put out in good condition except two lots taken from the lower ponds; these had many undersized fish that were less strong than the average. The unhealthy conditions in these pools were enhanced by great masses of leaves that drifted in, nearly filling them.

Of the various means adopted to improve the ponds an increase of shade has proved the most effective. Wherever floating shades were used the capacity of the water area for rearing trout was materially increased. As an instance, one pool shows an increase from 3,000 fingerlings last year, before it was provided with shade, to 10,000 this year, as a result of adequate shade. Two other small pools show increases of 1,000 and 2,000 trout respectively. For lack of other material brush has been largely used for shade, and, though unsightly, it is possibly the best thing for the purpose.

Further increase in the fingerlings it is possible to raise at the Sutton hatchery can be reasonably expected only through the utilization of some unused springs below the hatchery building. The ponds now in use cannot be expected to produce much more than they do now, and in building additional ponds at the source of the water supply that feeds the brood pond there is danger that, because of an excessive utilization of water at the source, the water in the brood pond and below the dam may become more or less vitiated so as to reduce its capacity for supporting fish life. Whatever extension is contemplated should be undertaken with caution, and measures should in all cases be adopted to keep the water as cool and pure as possible.

The foregoing explicit statements not only show the difficulties attending the rearing of fingerling fish, in which success has been attained at Sutton equal to the best we know of, but they also indicate unmistakably the limitations of the work with the present facilities available to the commission.

Rearing Ponds, etc.—Little has been done this year in building rearing ponds. A small pool was built near the tub system at Hadley which was fed by a very limited supply of

spring water of low temperature, but the flow was so small that only comparatively few fry could be put into it.

Pending the results obtainable from sinking an artesian well, it was deemed unwise to do much to enlarge the pond area, even if that is practicable, for it was felt that if the well proved a failure the commission would be compelled to abandon its purpose to raise fingerlings there in any numbers, and to use the station only, or chiefly, as a hatchery and a distributing point for trout fry.

The artificial pools at Hadley, both below and above the large pond, have been utilized for the growing fish, but only one, aside from the little pool mentioned, has been devoted to raising fingerlings. The others — one pool below the dam devoted to brown trout, and others above the brood-trout pond — have been assigned to growing various species of trout and the landlocked salmon which have attained to or are near sexual maturity. As already stated, these fish have done well.

With the object of improving these pools, as well as to add to the general appearance of the hatchery surroundings, willows have been planted along the sides where shade is needed, while one side of each pool is left clear so that a seine or other device can be used if circumstances demand it. Willows have also been planted along the brook that feeds most of the ponds, the object being to shade it and thus keep the water cooler.

At Sutton, one pool or rearing pond eight by sixty feet has been built below the hatchery, which, like all the other pools there, is fed by spring water. This was constructed under very difficult circumstances, the site being soft mud in which numerous pine logs and stumps were embedded. The brook below the hatchery was cleaned of accumulated mud, deepened and prepared for holding yearlings.

The ponds or pools heretofore used at Sutton for yearling spawners are very shallow, and Superintendent Merrill ascribes much of the loss met with in this class of fish to their greater exposure on this account. Lack of depth, and of accessible means for hiding, place the trout at much disadvantage. This condition is, however, susceptible of remedy, and all time that the hatchery force can possibly spare from other duties will be devoted to improving the ponds, by deepening them and mak-

ing such other changes as experience has shown to be desirable. The deepening and cleaning of the brook below the hatchery, heretofore mentioned, are steps in the direction of perfecting the water system that will continue until all that is practicable has been accomplished.

Much is contemplated in the way of providing shade for the brood pond or ponds at Sutton by planting young trees to take the place of the old dead trees already cut down, or of others which may die and therefore have to be similarly disposed of. Inasmuch as it will take some years for trees to grow to sufficient size to furnish the requisite shade, it is deemed advisable to begin the planting of them now, especially as this work can be done without additional cost to the State, and the matter is vastly important to the preservation of the brood stock of fish. Considerable has already been done along this line and the work will be continued as opportunity offers and the conditions seem to demand.

The tub system has been enlarged by the erection of a new structure at the west end of the hatchery building, upon which eighteen tubs were placed. Two lines of pipe were laid to supply these tubs with water, one from the brood pond and one connecting with the hatchery supply. Sixty screens — a double set — were made to cover the tubs.

All the water system at Sutton, including ponds, pools, tanks and tubs, has been utilized this year, but to what extent it can be made capable of meeting larger demands in the future remains to be seen. In any event it may, perhaps, be safely predicted that it will be drawn upon to the limit in the not distant future, and all possible additions to it will be made.

Brood Fish. — There has been considerable increase in the numbers of brood fish this year but far less than was expected, due to causes that will be mentioned. Many of the young trout that the commission has been raising for the past two or three years to add to its brood stock have been destroyed by enemies, despite the persistent efforts of the hatchery superintendents to prevent it. The following statements give in detail the status of the brood fish and also show the determined fight waged by those in charge of the hatcheries to protect and preserve the fish under their care.

The landlocked salmon are approaching maturity and will probably yield eggs in a year from now.

At the Hadley station there are about 500 rainbow trout that should spawn next February, and some 350 others which should reach maturity a year later. There are also 140 egg-bearing brown trout, about 500 large brook trout and 300 smaller brook trout, a year and a half old, which will yield some eggs this year.

The brood fish in the large pond at Hadley have been decimated materially during the year; Superintendent Tripp estimates the decrease at fully one-third. The greater part of this loss is undoubtedly due to enemies, against which a constant fight must be waged. These enemies are fish-eating birds and animals, some of which are largely destructive. This is especially so of the otter, which is supposed to prey upon the trout; but, although tracks have been seen and efforts have been made to trap the nocturnal visitor to the ponds, no otter has yet been seen or taken. Two minks have been trapped this fall, and twenty-five kingfishers, seven herons and one fish hawk have been shot. The continuance of efforts to destroy such enemies it is hoped will finally result in ridding the station of their depredations, or at least minimizing the losses. It is evident, however, that, in the mean time, it will be necessary to continuously provide for a large yearly increase of brood fish at Hadley in order to keep the stock where it should be, after the losses that must result from enemies and other causes.

The brood fish also suffered material loss at Sutton, most pronounced among the trout just reaching maturity, consequently the anticipation of having all the mature fish at that station that could be kept in a healthy condition has not been realized. The causes of the decrease are somewhat various, but the loss is chiefly ascribable to enemies.

Superintendent Merrill reports that 50 of the largest spawners were taken from the brood pond dead, during the summer, and he thinks many others probably died and were covered by the mud at the bottom of the pond and thus escaped observation. Fifty or 60 large spawners were rendered infertile by the prevalence of throat disease, and consequently were lost, to

the extent at least that they bore no eggs. As a result of all this, and losses probably caused by enemies, the older trout in the brood pond were several hundred less than anticipated; they numbered 1,300. These were nearly all brook trout, for the rainbow trout and landlocked salmon have all been assembled at Hadley, and most of the brown trout as well, there being now only a few of this species at Sutton.

The greatest mortality to brood fish at the Sutton station was noticeable among the brook trout which had just attained sexual maturity. Two thousand of these had been put into the runway below the hatchery, where the conditions were good, and only normal loss was expected. Only 400 of these fish were left this fall when the breeding season opened. This excessive loss is believed to have been due largely or wholly to the predatory attacks of the night heron, which is the most troublesome to the fish culturist of all the herons, because of its nocturnal raids on fish ponds. These are difficult to prevent, while it is equally difficult to detect and kill these feathered marauders in the darkness. Many of these herons were killed, as a result of care and watchfulness, but despite this their numbers seemed to increase during the summer, many coming from a heronry apparently not far distant toward the north-east.

To compensate for these losses, so far as possible, 8,500 brook trout fingerlings have been reserved at Sutton from which to select next year as many as are required to bring the breeding stock up to the highest standard of efficiency that the water resources there will admit of.

Taking Trout Eggs. — The work of taking trout eggs at the Hadley and Sutton stations began in early November, as usual, but apparently many of the fish were slow in reaching a spawning condition, due possibly to the exceptionally mild weather in October and November. The most remarkable thing in connection with the annual collection of trout eggs is the fact reported by Superintendent Merrill that, at Sutton, the fish yielded nearly 43 per cent. less eggs than trout of the same age and size have produced heretofore. He says: "A smaller collection of eggs than expected was made by reason of the small

yield per fish, — only about 1,000, as compared with 1,750 the season before.” *

Because of this, the eggs obtainable at Sutton will not probably exceed in number those collected there last year, but the prospect is that more will be secured at Hadley than ever before. Thus, despite the destruction of brood fish to an unparalleled extent, and this altogether unlooked-for decrease in the yield of eggs per fish, the number taken so far equals or exceeds any previous record, and it is reasonably certain that there will be a larger yield for the balance of the trout-hatching season than ever before, although the total will come far short of what was hoped for and expected.

The one consolation to be derived from the present condition, in which unexpected losses have played so prominent a part, is this: the vigorous measures taken at the hatcheries have had the effect of maintaining their productiveness, despite the most untoward circumstances, thereby obviating any real evil effects, where otherwise the result would have been disastrous in the extreme.

Artesian Well at Hadley. — After the experience of last year in the attempt to raise fingerling trout at Hadley, and the mortality resulting from the use of brook water, it was evident that it would be necessary to sink an artesian well on the hillside above the hatchery, with the hope and purpose of securing an adequate supply of spring water of suitable temperature, or abandon the effort to raise trout at that station. It was, therefore, decided to ask for an appropriation deemed probably sufficient for the purpose of sinking a well. The amount asked for was \$600, and this was granted.

As soon as practicable, after the money became available, bids for sinking the well were invited. Several bids were received, but all of them were much in excess of that accepted.

After the bids were opened, May 16, 1902, a contract was concluded with F. A. Champlin of East Longmeadow for sinking the well. This contract, signed June 9, 1902, provided for the sinking of a well that should be sufficiently large above the point where a solid ledge was met with to receive an iron

* We are informed that those engaged in private fish culture have had the same experience with their trout, but no one has ventured an explanation of the cause.

pipe or sleeve six inches in inside diameter, this pipe to pass far enough into the ledge to prevent seepage or leakage; the diameter of the hole below the foot of the pipe and downwards through the ledge was to be six inches.

The price agreed upon was as follows: "The contractor agrees to furnish all material and labor necessary to drill a hole and sink the pipe heretofore referred to to the ledge, and into the same sufficient to prevent drainage, for the sum of two dollars per foot, and to drill a hole six inches in diameter into the ledge to the depth desired for the sum of two dollars and twenty-five cents per foot."

The work of sinking the well was slightly delayed, but it was begun June 20, and continued practically without interruption until its conclusion. A few feet below the surface stone was encountered, and this continued practically without interruption or change, except in the character of the strata, which varied somewhat.

The well was sunk to a depth of 275 feet, which exhausted the sum that had been appropriated for it.

Hopes were entertained that, before this, a flow of water might be struck which would have considerable force. This was not the case, however, and such flow as was met with was more in the nature of seepage than a distinct stream, — a condition not uncommon with artesian wells in this region we understand, although the contour of the hills would indicate otherwise.

The spot where the well was sunk was at the extreme corner of the State land in the rear of the hatchery, and toward the hill lying back of it. There the ground is about 22 to 25 feet higher than the water outlet at the hatchery. This was sufficient decline to justify the hope that the water in the well could be taken into the hatchery by a siphon without difficulty. The several attempts made by Commissioner Delano to accomplish this proved unsatisfactory, however, and finally it was determined to dig a ditch for a pipe that should lead direct from the hatchery to the well pipe, which was tapped twelve feet below the top. This permits the water to flow from the well into the hatchery troughs by gravitation, insures steadiness of flow and obviates any danger of freezing. The flow is limited to twelve

gallons per minute, which, it is assumed, may always be relied upon at any season. To this extent a supply of water for hatching is assured, but this amount will not prove an important factor for raising fingerlings, for which it was much needed.

Purchase of Land. — For the past two years or thereabouts the commission has, through the courtesy of the owner,* enjoyed the privilege of using, free of rent, some land adjoining that owned by the State at Sutton. This land, while not specially valuable for general purposes, was of a swampy nature and filled with springs, hence its possession by the commission as a source of water supply was of the utmost consequence to the fish-cultural work, particularly the raising of fingerlings. Indeed, it is not too much to say that the continuation of the work of raising fingerling trout and salmon at the Sutton hatchery, on the scale planned, would not have been practicable except for the control of the water supply from the land referred to. At the same time it is but just to say that this land may prove highly serviceable for other purposes, such as the rearing of game birds and animals, in the event it is found desirable to develop this line of effort to a greater extent at the station.

Money having been appropriated for the purpose at the last session of the Legislature and proper authorization given, the commission purchased two small lots of land adjoining that it had before, the whole aggregating three and three-quarters acres, for which the sum of \$225 was paid.

The acquirement of these lots, aside from the advantages already specified, rounds out and completes the area owned by the State at Sutton, and in this particular alone vastly improves it for any purpose for which it may be required by the commission. It is now practicable to develop this station to its fullest capacity, with the confidence that ownership gives, and the assurance of success which is inspired by the knowledge that well-devised plans may not be interfered with because of lack of tenure, or uncertainty concerning it.

Fencing State Land at Sutton Hatchery. — For some time past the success of the attempt to raise fingerling and yearling

* Until this year, when a definite survey was made, it was supposed that the land in question was the property of more than one owner, and so confident was every one concerned that such was the case that the fact was stated in our last report that we were indebted to two owners.

trout and salmon at the Sutton station has been jeopardized, in a measure, by the lack of any means to prevent flocks of domestic ducks from frequenting the trout-rearing pools, where they were liable to destroy many young fish. There was also constant danger that cattle might make incursions on to the State land, upset the small coops or boxes where pheasant eggs were in course of incubation, or destroy valuable young trees, the material grown to feed pheasants, or ornamental shrubs or flowers. For these reasons the hatchery grounds have been fenced on three sides this year with 110 yards of Page wire fencing five feet high. This was done before the purchase of the new addition to the hatchery land, and the fence was extended only far enough to keep out cattle and ducks for the present. What has been done is a much-needed improvement, but the purpose is to ultimately enclose the whole tract of land with a wire fence, and to that extent seclude the fish, plants, etc., from injury or interference.

The labor attending the building of this fence, owing to conditions of soil, etc., was very hard on the hatchery force of two men, who did this in addition to their routine duties. A similar fence is needed at Hadley.

Ponds stocked. — Nineteen great ponds of the State have been stocked with food fish, and the fisheries in seventeen of them have been regulated in accordance with section 19, chapter 91 of the Revised Laws. Except for action due to unusual conditions, and for which the commission was not responsible, twenty ponds would have been stocked, which would have equalled the number stocked and closed last year.

Following are the names and locations of the ponds, together with the species of fish put into them : —

Onota Lake, Pittsfield; Cranberry Pond, Spencer; and Hardwick Pond, Ware, were each stocked with rainbow trout and landlocked salmon; Pentucket Pond and Rock Pond, Georgetown; Queen Lake, Phillipston; Whalom Pond, Lunenburg; and Snows Pond, Ware, were stocked with rainbow trout alone. White perch were put into Little Sandy Pond, Pembroke; Maquan Pond, Hanson; Milford Pond, Swansea; Scaddings Pond, Taunton; Winnecunnet Lake, Norton; Dennis Pond, Yarmouth; Stiles Pond, Boxford; North Pond, Orange; and Middle Pond, North Dana.

The rainbow trout and salmon put into the ponds were fingerlings, and the white perch were nearly of adult size, being much larger than are commonly used for such purpose, due in part at least to the fact that they were caught a full month or more later in the season than is customary.

Uniform regulations have been applied to the ponds and lakes above mentioned. These regulations prohibit, for three years from date of issuance, "all fishing from the first of November to the first of June of each year." Fishing is permitted, however, "with single hook and handline, or line (with single hook) attached to a rod or pole held in the hand, on Monday, Wednesday and Saturday of each week, from the first day of June to the first day of November of each year," while the regulations are in force. A penalty of twenty dollars for violation of these regulations has been fixed by the commission.

The attempt of the commission to stock Harris Pond, in Methuen, was defeated, because the selectman, who directed the planting of the white perch sent there, had the fish put into the water on an overflowed meadow not connected with the pond. On this account no regulations could be applied to Harris Pond.

Long Pond, Wellfleet, and Pocksha Pond, Rock, were stocked, but no regulations were applied to them.

Several ponds have been stocked with landlocked smelt. Mr. Merrill, superintendent of the Sutton hatchery, reported upon this as follows:—

On April 8, 1902, I, in company with Mr. Luman, went to Poor Farm Brook to get smelt eggs. Evidence was found that the fish had spawned in the stream in great numbers. Beginning at a point just above the back water from the lake, for a long distance up the stream, probably 15 rods, the bottom of the stream, except in a few holes, was sheeted with spawn, in some places several layers deep. The number deposited must have been hundreds of millions. Evidence was seen that thousands of fish were destroyed, for they were scattered all along the banks of the stream and lay in heaps in the dead water at the lower part of the stream. Information given by inmates of the city farm and electric car men indicated that large numbers were caught until notice was given out that the catching of

them was illegal. During the latter part of the run the stream was watched by the inmates of the city farm and fishermen were warned away. It is reported that the smelt spawned in Mud Pond Brook and Coal Mine Brook as freely as they did in Poor Farm Brook. Fifty thousand eggs were collected and planted in Lake Chaubunagungamaug in the town of Webster, and 50,000 in Forest Lake in the town of Palmer, by Mr. Luman. On April 12, 125,000 were collected and planted in Dority Pond in the town of Millbury, 75,000 in Singletary Lake in the town of Millbury, 25,000 in Coggin Reservoir in Sutton and 25,000 in Ripple Lake in Grafton.

The object of stocking these ponds with smelt was, primarily, to provide a natural food for landlocked salmon. It is altogether probable, however, that the smelt may prove a desirable food for other species, notably bass, perch and trout. It is also a fine food fish, and, though it is diminutive in size, it can furnish some sport, if very fine tackle is used.

The method of stocking was simply to transfer eggs from the streams that empty into Lake Quinsigamond to the ponds mentioned. Nothing more is required.

It was planned to stock several ponds this year with pike perch, and a request for a large number of eggs was sent to the United States Fish Commission. Unfortunately, however, owing probably to the temporary absence of the commissioner and some clerical error, the application was misplaced, with the consequence that no eggs of this species were received by this commission. This was a serious disappointment and is to be regretted, especially in view of the fact that except for this unexpected happening there is no question but a liberal assignment of pike perch eggs would have been sent us.

The heavy mortality to rainbow trout, and consequent reduction of the number of fingerlings available for distribution, made it impracticable to do more with this species than was done. There were no fish of this kind to put into other ponds, hence the intent to supplement the stock in other waters had to be abandoned.

Many of the ponds stocked this year and the two previous years are becoming, more and more, favorite resorts in summer for those fond of fishing and boating. For this reason there is a growing demand for stocking ponds and regulating

the fishing in them, since any increase in fish makes them doubly attractive and correspondingly valuable to the community where they are located. The fact that forty-nine ponds have been stocked in three years is sufficient evidence of public feeling in relation to this matter.

Pond leased.—The commission leased Farm Pond, so called, in Cottage City, Dukes County, to Thomas D. Crowell for a term of eleven years, from May 7, 1902. This lease was made in conformity to chapter 283, Acts of 1902.

Brooks stocked and closed.—Petitions for stocking three streams and regulating the fishing therein, in accordance with section 5, chapter 91 of the Revised Laws, have been received. It was found that one of these streams, Lily Brook, at Cohasset, is liable to run dry in summer, and for this reason no attempt was made to stock it.

The two streams stocked were the Shawsheen River in the town of Tewksbury, and Fort Meadow Brook, Marlborough. One thousand fingerling brown trout were planted in the former, and 2,000 yearling brook trout were placed in the Marlborough brook.

These streams are closed to all fishing for three years, with the following exceptions: fishing is permitted "with single hook and handline, or line (with single hook) attached to rod or pole held in the hand, on Tuesday, Thursday and Saturday of each week during the trout-fishing season for the year ending Dec. 1, 1905." Penalty for violation of regulations is \$20.

In addition to the above-mentioned distribution of fish under the statute referred to, 1,000 yearling brook trout were put into Flat Brook, Ware, and 1,000 of the same kind of fish in Stock Company's Meadow Brook, at Wrentham. Flat Brook was first stocked last year, but inasmuch as the fish then planted were insufficient, it was deemed necessary to restock it this year, in accordance with a plan adopted in reference to brooks. Stock Company's Meadow Brook had also been previously stocked, and the fish put into it this year completes the trout deposits in that stream, under the special act referred to.

Rivers stocked.—In recent years the commission has limited its fish-cultural efforts to stocking brooks and ponds, and for

some time nothing has been done to stock the rivers, due to the unsatisfactory results obtained from stocking the Merrimac with salmon and the Connecticut with shad. This year, however, a renewed effort has been made to improve the conditions of fish life in some of the smaller rivers, although the hopelessness of securing anything like encouraging results in either the Merrimac or Connecticut is still too apparent to warrant any attempt to stock either of them.

Large plants of shad have been made this year in the head waters of the North River and the Taunton Great River, and brown trout fingerlings have been put into Miller's River and the Shawsheen River.

It is believed the brown trout, which attains to large size under favorable conditions, may thrive in these rivers much better than the native brook trout, and, perhaps, may supply good fishing in a few years where now there is practically nothing to tempt the angler.

While North River and Taunton Great River are not entirely exempt from obstacles to the increase of fish, there is reason to believe shad may thrive in them, and may be able to reach their spawning grounds at the head waters by means of the fishways or otherwise. If this reasonable anticipation is realized, the effort made to stock these streams this year, which it is proposed to repeat in subsequent years, if practicable, may prove of much consequence in establishing a profitable shad fishery within the limits of this State. The fact that immense numbers of young shad were seen at Middleborough in October on their way down Taunton Great River, and that many thousands were seen descending North River, is at least encouraging.

Examination of Ponds. — The examination of ponds by the chairman has been continued, and every opportunity has been improved to secure such data as seem necessary to insure proper and intelligent action in stocking these waters. It is evidently of the highest importance that there should be available knowledge of the conditions in the great ponds of the State in order that the work undertaken for the betterment of the fish life in them may be well expended, and that the public may be correspondingly benefited. Much has been done in this direction during the summers of 1900 and 1901, as well as this year, and

a continuance of this system will ultimately put into the hands of the commission facts concerning practically all the ponds in the State.

Fifteen ponds have been examined during the period covered by this report. There was an earnest desire to extend this work farther, but the very limited time for it after the adjournment of the Legislature (before which it could not be undertaken), and the many demands in other directions, made impossible further accomplishment in this direction. In one instance, as noted, a satisfactory examination could not be made because no boat could be secured. Following are concise statements of the conditions deemed most important for the purpose indicated, so far as ascertained in the ponds visited or examined:—

Round Pond, Tewksbury: The principal species of fish in this pond are pickerel, pout or catfish, yellow perch and shiners. The bottom is chiefly soft mud. The pond is largely covered with lily pads. The surface temperature on July 23 was 74° F.; 66° at 13 feet, which was the maximum depth found.

Rock Pond, Georgetown: The most noticeable species of fish in this pond are black bass, yellow perch, pickerel, white perch, catfish, sunfish or roach and shiners. There is generally a scarcity of fish in the pond, though yellow perch and pickerel are reputed to be most abundant. While it is stated that there are white perch in the pond, they are so scarce that some doubt their presence there. The bottom of the deeper parts is soft mud, at least over a large area, but there are patches of sand, gravel and stones around the edges of the pond. Scragg Brook and Rock Brook run into the pond. The surface temperature on July 29 was 76° F. The temperature at different depths was as follows: 71° at 12 feet; 68° at 14 feet, and 66° at 17 feet, which was the maximum depth obtained.

Pentucket Pond, Georgetown: The same varieties of fish found in Rock Pond also occur in Pentucket Pond, which is connected with the former by a small stream. On July 29, when the pond was visited, one man had caught 22 pickerel, but they were all of small size, the largest not exceeding 2½

pounds to 3 pounds in weight. There is a soft mud bottom through the centre of the pond in the deeper areas, but patches of gravel and pebbles near the shore. No brook runs into this pond excepting the one which connects it with Rock Pond, but a brook flows out to Parker River. Surface temperature was 76°; temperatures at various depths as follows: 68° F. at 24 feet and hard bottom; 62° at 27 feet, which was the maximum depth found.

Bald Pate Pond, Boxford: The leading varieties of fish in this pond are black bass, pickerel, white and yellow perch, catfish or pout and shiners. Shiners are reputed to be scarce, but there is a fair abundance of black bass and pickerel. There are patches of greater or less extent of gravel and pebbles near the shore, but the bottom in the centre of the pond, or in the deeper portions, is soft mud. The surface temperature on July 29 was 76° F.; 58° in 27 feet, 54° in 34 feet, and 52° in from 36 to 40 feet, which were the maximum depths obtained. One brook runs into this pond at its head, near the so-called poor farm, and one flows out of it at the opposite end.

Whalom Lake, Lunenburg: This fine pond has in recent years become a favorite resort of many people during the summer season. The principal species of fish are pickerel, black bass, yellow perch, catfish or pout, sunfish and shiners. Perch are reputed to be most abundant, but practically all species are scarce. The character of the bottom is varied, there being patches of rocks, pebbles, gravel and mud. It is more or less grassy over a considerable area. No lily pads were seen at the time of examination, on September 5. The maximum depth of 40 feet was obtained at a point near the outlet, but the average depth was about 15 feet. The temperatures obtained on September 5 were as follows: surface, 73° F.; at a depth of 17 feet, 70°; 32 feet, 59°; 40 feet, 55°.

Massapoag Pond, Lunenburg: This is a shallow pond with comparatively high temperature. The principal species of fish are pickerel, black bass, yellow perch, catfish and sunfish. Catfish or pout are comparatively abundant in spring, but all species are reputed to be scarce. Bass are seldom taken. It has a soft muddy bottom over the greater part of its extent,

but there are stones, gravel and sand around the shores. The bottom is covered with patches of grass, and there are lily pads in places, making it apparently a good pond for pickerel, and probably white perch or black bass might thrive there. The maximum depth obtained was 13 feet, with a soft muddy bottom. The temperatures on September 5 were as follows: surface, 76° F.; depth of 13 feet, 70°.

Cattacoonamaug Pond or Shirley Reservoir, Lunenburg: This pond, which has been much enlarged by flowage, is characterized by a remarkable number of bays and coves and by long narrow points jutting out into it. It is shallow over a large area, but is comparatively deep in that section which was formerly the natural pond. The maximum depth obtained was 36 feet, but at the time of examination the pond was about 6 or 7 feet below its maximum height. The principal species of fish are black bass, pickerel, yellow perch, sunfish, and pout or catfish. The bottom was muddy in the greater depths, with patches of pebbles and gravel along the shore in some places. No lily pads were observed. The temperatures obtained on September 5 were as follows: air, 67° F.; surface, 73°; at a depth of 13 feet, 62°; at 19 feet, 58°; and at 36 feet, 52°. This pond furnishes a water supply for mills, but not for towns. It was originally a great pond of the State, but, as already indicated, its area has been materially increased by flowage so that it is claimed it covers a thousand acres when completely full.

Onota Lake, Pittsfield: This is a large, fine pond much resorted to for fishing, especially in summer, when it is highly prized by the citizens of Pittsfield. It is reputed to have a depth approximating 100 feet, but the maximum depth obtained in the examination made on September 9 was 65 feet. The principal species of fish are pickerel, black bass, bull-heads or catfish, yellow and white perch. The pond was stocked in 1892 with white perch and other varieties and about 1895 with carp. It has also been stocked with rock bass which, though plentiful, are little appreciated. It is claimed that black bass are not taken in abundance, but that the fishing for pickerel and bull-heads is fairly good. The bottom is varied in its characteristics. In the shallower areas it is covered with a

profuse growth of aquatic grass. The shores are sandy, rocky and pebbly in patches, and soft mud prevails in the deeper areas. The temperatures obtained September 9 were as follows: air, 72° F.; surface, 70°; at a depth of 30 feet, 64°; 38 feet, 60°; 42 feet, 58°; 54 to 65 feet, 55°; and, in one place, 56° in 60 feet. There appear to be few, if any, lily pads.

Pontoosuc Lake, Pittsfield: This pond is also a favorite resort for Pittsfield citizens, but is not so large as Onota Lake. It is shallow over its entire extent, and markedly so over considerable areas, especially across the centre, where a bar extends almost from shore to shore. The depth for the most part does not appear to exceed 10 or 15 feet, with a heavy growth of aquatic grass on the bottom. The principal species of fish are pickerel, black bass, yellow perch and bull-heads. The bottom is soft mud in the deeper sections of the pond, but there are patches of sand, gravel and pebbles around the shore. The temperatures obtained on September 10 were as follows: air, 58° F.; surface, 66°; * at a depth of 10 feet, 66°; at depths of 14 feet and 19 feet, 64°.

Garfield Lake, New Marlborough: This is a beautiful pond of large area, with good depths for the most part, deep water in places being close to the shores. The maximum depth obtained was 30 feet, and this depth extends over a very large area, with a uniform temperature of 66° F. The shores of the pond are fast becoming favorite resorts in summer. The principal species of fish are black bass, † rock bass, pickerel, yellow perch, bull-heads or catfish, sunfish and shiners. This lake was formerly noted for the abundance of fish in it, but it is claimed that when the pond was drawn down a few years ago to some extent by Connecticut manufacturers, who are reputed to have control of it as a water supply for running their mills,

* The surface temperature was doubtless considerably affected by the low air temperature at the time the observations were made, and it is probably fair to assume that in hot days in summer the surface temperature may rise to approximately ten degrees or more above that obtained at the time it was taken on this occasion.

† On September 11, when this pond was examined by the chairman of the commission, a black bass was caught reputed to weigh over five pounds. Another bass had been taken a short time previously by Mr. J. H. Parker that weighed four and one-half pounds.

great quantities of fish were allowed to escape from the pond. Since that time those who fish there claim that fish have been much scarcer than formerly. The principal change, however, appears to be observable in the lack of abundance of black bass. Pickerel are reputed to be plentiful, perch fairly abundant and rock bass more numerous than is desirable. The bottom of this pond is muddy in spots in the maximum depths, but apparently there are large areas of stone, pebbles, gravel and sand. In some sections, and especially in the coves, the bottom declines gradually, and there are weeds and lily pads; but in many places it falls off steeply to depths from 20 to 25 feet close in to the shore. The temperatures obtained on September 11 were as follows: air, 70° F.; surface, 71°; at a depth of 21 feet, 67°; and, in depths ranging from 22 to 30 feet, a uniform temperature of 66°.

Johnson's Pond, Boxford: This is a pond of considerable extent and generally rather shallow, with depths ranging from 4 to 7 feet over large areas. Fish are reputed to be scarce. The principal species are pickerel, black bass, yellow perch, bull-heads or catfish, sunfish and shiners. Pickerel are said to be most abundant, but, generally speaking, there is a lack of plentifulness of fish. The bottom for the most part is covered with a rank growth of grass and weeds, but is apparently soft mud, gravel and sand. There are some lily pads in the shallow parts. A brook runs into the pond on the northwest side. The following temperatures were obtained on September 16: air, 70° F.; surface, 70° and 71°; at a depth of 8 feet, 68°; at a depth of 27 feet, which was the maximum depth obtained, 67°.

Harris Pond, Methuen: The principal species of fish in this pond are pickerel, yellow perch, sunfish and shiners. The perch are abundant, but pickerel are small and not very plentiful. The bottom is soft mud in the deeper portions, but there are patches of hard stones, coarse gravel and sand in some sections in depths varying from 10 to 12 feet, and nearer shore. Along the shore in some places are pond lilies. The maximum depth found was 28 feet. The temperatures obtained on September 17 were as follows: air, 68° F.; surface, 70°; at a depth of 10 feet, 68°; at 27 and 28 feet, 60°.

Cranberry Pond, Spencer: This pond was visited on September 18, but, owing to lack of a boat, it was impracticable to examine it satisfactorily. The principal species of fish are pickerel, yellow perch and pout or bull-heads. The first two species are reputed to be abundant. The shores are composed chiefly of stones, coarse gravel, pebbles and sand, and it may fairly be assumed that the bottom near the shore is more or less of this character. The pond is fed by springs, there apparently being no stream running into it, but there is a small brook that runs from it as an outlet. The temperatures obtained were as follows: air, 67° F.; surface at shore, 68°; at a depth of 5 feet, 66°.*

Queen Lake, Phillipston: The bottom is rocky for the most part, but with patches of gravel and pebbles. The maximum depth obtained was 20 feet, although the water at the time of examination was about 5 feet below high-water mark. The water is very clear. On September 20 the temperature at depths of 10 and 12 feet was 62° F., and at 20 feet 61°, which was the minimum temperature obtained. The principal species of fish in this pond are pickerel, pout or catfish, black bass, white and yellow perch.

Flax Pond, Lynn: This is a fair-sized pond and thickly settled on one side, and evidently destined soon to be surrounded to a greater or less extent with dwellings, and thus be included in the comparatively densely settled section of the city of Lynn. At the present time it is important as a source of recreation to the citizens of Lynn for rowing, sailing and fishing, and probably will become increasingly so. It is noteworthy for having several shallow bars, some of them extending wholly or nearly across the pond. These bars, as a rule, are sandy or gravelly, and doubtless afford good spawning beds for certain species of fish. The most important kinds of fish found in the pond are pickerel, black bass, white and red perch, horn pout or catfish, sunfish and shiners. Pickerel, white perch and yellow perch are reputed to be plentiful, but black bass and catfish are not so numerous. The bottom, as a rule, is soft mud, but gravel and hard sand are found at the east end in

* This temperature was obtained at the so-called dam, at or near the outlet, where there is a depth of 5 feet.

from 8 to 12 feet of water. The maximum depth obtained was 26 feet. A few lily pads were observed in the coves. A small, sluggish, stream-like waterway, with apparently no flow either one way or the other, connects this pond with Spruce Pond. This narrow waterway is apparently badly polluted by discharge from a leather mill located on its bank. The temperatures obtained on September 26, when the pond was examined, were as follows: air, 60° F.; surface, 64°; at a depth of 7 feet, 64°; at depths ranging from 24 to 26 feet, 61°.

Work of the United States Fish Commission. — The output of fry from the hatcheries of the United States Fish Commission at Woods Hole and Gloucester, during the period covered by this report, was undoubtedly the largest in the history of the fish-cultural work of the federal government on the coast of this State. While the production of cod fry was not equal to the output of 1900, it exceeded that of last year, and the work of hatching flatfish has reached extraordinary proportions this year.

Owing to favorable conditions in the spring, at the very beginning of the lobster-hatching season, the result at the Gloucester station was largely in advance of that of last year. At the Woods Hole station, however, even favorable weather could not overcome the conditions resulting from a marked decadence in breeding lobsters, consequently there was a falling off from last year.

The statements received from the United States Fish Commission show that the total yield of the hatcheries at Woods Hole and Gloucester was 458,136,000 fry, of which 418,656,000 were planted in the coast waters of Massachusetts. Of the number of fry thus added to our waters, 212,001,000 were cod, 168,133,000 were flatfish and 38,522,000 were lobsters.*

The aggregate output of fry from the two hatcheries this year exceeded that of last year by upwards of 47 per cent. This result should be of much interest to citizens of this Commonwealth, especially those concerned in the prosecution of the coast fisheries.

* Of the lobster fry planted in State waters, 8,170,000 were hatched from eggs obtained outside the State, as will be shown in detail elsewhere.

The following detailed statements, furnished by the United States Fish Commission, clearly indicate the points along the coast of this State where cod and flatfish fry have been distributed, the numbers of each planted, and the totals produced at the hatcheries : —

Statement of Cod and Flatfish hatched and planted in Massachusetts Waters by the Gloucester and Woods Hole Stations of the United States Commission of Fish and Fisheries, during the Fiscal Year ended June 30, 1902.

	Cod.	Fry.
Woods Hole great harbor, Woods Hole,		1,257,000
Vineyard Sound :		
Robinsons Hole,		32,265,000
Tarpaulin Cove,		69,574,000
Nashewena Island,		16,315,000
Quicks Hole,		5,231,000
Off French watering place,		3,132,000
Hadley harbor,		1,036,000
Atlantic Ocean :		
Gloucester,		60,033,000
Rockport,		23,158,000
Total,		212,001,000

	Flatfish.
Woods Hole great harbor, Woods Hole,	113,996,000
Eel Pond, Woods Hole,	13,621,000
Waquoit Bay, Waquoit,	28,557,000
Hadley harbor,	7,623,000
Buzzards Bay, Monument Beach,	4,336,000
Total,	168,133,000

It seems scarcely necessary to invite attention to the important proportions of this work and its possible effect on the fishing industries of the State, for no one can fail to be impressed with its consequences to those who depend on the fisheries. Details of the distribution of lobster fry will be found in the chapter on lobsters.

In other chapters mention is made of the eggs and fry of fresh-water species contributed by the United States Fish Commission for stocking our inland waters.

Fishways.— There has apparently been less occasion for active work this year in the matter of fishways than at any time

during the past two years. Nevertheless, considerable time has been devoted to it, and examination has been made of dams, etc., in every case where it has been represented that action should be taken. Thus, although it has been found necessary to order the building of comparatively few fishways, much other work has been done in the way of procurement of data. In several cases no action has been taken for very good reasons, and in other instances help was given in the adjustment of fishways, etc., as the circumstances demanded.

Complaints came to the commission in the spring that the fishway at Weir River, so-called, in Yarmouth, was not working satisfactorily, and also that there was some trouble about alewives getting up Herring River at Marstons Mills. As a result of this Commissioner Delano visited the fishway at Weir River on April 28, and his examination and suggestions resulted in a satisfactory arrangement for the passage of fish. He also went to Marstons Mills on May 2 and made arrangements with parties there to have a screen put in and other changes made which would enable the alewives to get through to the pond without difficulty and without going through the cranberry bogs.

A numerously signed letter, inviting the attention of the commission to Neponset River, so far as the fishways are concerned, was received late last autumn. As soon as practicable a careful examination was made by the commissioners of the dams on the Neponset River, and of the condition of the river itself. There are several dams at Milton and farther up the river where there are no fishways; but the river is so badly polluted with the material poured into it from the mills along its banks that the investigation led to the conclusion that the establishment of fishways would be of no practical use, since it is not believed that fish can live in a stream in such a condition as the Neponset River is in above Milton. For not only was the water thick and filthy to look upon, but the stench of the river in certain reaches was offensive to a degree, the filth polluting the water so completely that it must be deleterious to health as well as an impracticable barrier to fish.

The chairman and Commissioner Delano visited the stream

at Kingston during the spring and examined a well-designed fishway, then nearly completed, that was being built by the town for the passage of alewives. Another site farther up the stream was examined but no official action was taken, for the reason that it was understood the owner would voluntarily build a fishway.

The dam at Howlett's mill in Saugus and the water gate on the sluiceway between Saugus River and Hawkes Pond — both under the control of the water board of the city of Lynn — were examined, and measurements were made upon which to design fishways in the event that the water board decides it is more advisable to construct them than to adopt other measures, such, for instance, as tearing down the old dam at Howlett's mill, and thus permitting the passage of fish up the natural stream.

Prevention of Stream Pollution. — The work of enforcing the law (section 8, chapter 91, Revised Laws) relating to the pollution of streams by sawdust has been continued with the same vigor that has characterized it during the previous two years.

Orders prohibiting the discharge of sawdust were sent to the following mill owners during 1902: M. E. Hildreth & Co., Petersham; Enoch Foster, Tewksbury; W. O. Loveland, A. A. Carr and Albert M. Wilder, Ashby; William F. Symmes, Billerica; O. Ames & Sons, Daniel B. Davis and Algernon S. Lyon, West Bridgewater; the Rugby Chair Manufacturing Company and the Union Chair Company, Sterling; Bellows & Bradford, Clarksburg; Lucius S. Lawless, New Salem; Bowen, Hadley & Co. and Thomas Laporte, Templeton; David Shorer and John Vanstone, Prescott; D. A. Witter, George Thomas and J. C. & W. F. Hayden, Otis; Henry W. Soule, Tolland; heirs of the estate of N. L. Pratt and the Johnson Lumber Company, Sudbury; Gilbert Bradford, Williamsburg.

In some cases the owners thus notified operate two or three mills each, hence the number of mills affected by the order is larger than the list of firms and individuals owning them; thus the orders sent to the owners applied at least to twenty-six mills.

It is somewhat remarkable that this section of the commission's work, so far as the number of orders served and the number of mills affected, exactly parallels that of the previous year.

In three years — 1900, 1901 and 1902 — the discharge of sawdust into streams from sixty-seven mills has been prohibited, and the application of the law to this form of pollution of trout brooks and rivers has now become so general that the evil consequent upon filling the brooks with sawdust has been reduced to a minimum and little more remains to be done to obliterate it.

With this menace to fish life removed, and liberal stocking with fish, the streams should regain something of their pristine importance in supporting a numerous progeny of trout, — alike valuable for food and as a means of healthful recreation. The rehabilitation of the trout streams in many of the out-of-the-way places, thus making them a special source of attraction to those who delight to angle, is of larger consequence to those sections than may appear at first thought. Those who have carefully considered the matter are convinced that, even in Massachusetts, the only present prospect for material improvement in certain localities lies in an increase of their natural attractions; more especially those relating to fish and game.

If persons of wealth who are fond of fishing are influenced to spend a portion of each year in some locality because conditions are favorable to the enjoyment of their favorite sport, the people of the town are benefited. The actual money value of fish as placed upon the market is one thing, and may be far short of large importance. But, in such cases, the real practical consequence of fish in the waters may be justly based upon the amount of money put into circulation by sportsmen, by the increase of demand for farmers' products, by the employment of labor, by enhancement of value of real estate because of residences built, or purchases of estates, and by the money that unavoidably flows through many other avenues to benefit local residents when natural attractions in country districts are sufficient to draw those who, as temporary visitors or builders of estates, have it in their power to promote the wel-

fare of towns where there is seemingly no other opportunity to prosper.

Many of the water-driven sawmills in this State are situated in localities where the available supply of timber is more or less nearly exhausted, and where the chief natural asset, so far as a source of attraction is concerned, is found in the brooks, if they can be preserved from pollution and be restored to a fish-supporting condition.

To achieve this end is the evident purpose of the law, and even if the question of danger to health resulting from impure water should be ignored,* the action taken by the commission in the effort to save the trout streams from further deterioration must be deemed justifiable.

The objection to the enforcement of this law naturally resulted in a determined effort on the part of certain sawmill owners to secure the repeal of the law, in part at least, at the last session of the Legislature. This attempt failed.

One feature attending the enforcement of the law relating to sawdust pollution which affords occasion for gratification is the fact that, in many instances, the owners of mills have found it practicable to dispose of the sawdust, sometimes at considerable profit. In this way they have been saved from any actual loss, — always a matter of grave concern when people are working on small capital and with a limited margin of profit, — and in some cases there is reason to believe they have been

* Although the peril to health resulting from sawdust pollution may be less than is caused by the unrestricted discharge of many poisonous substances into streams from various other mills and manufactories, it is, nevertheless, no mere figment of the brain to declare that decaying sawdust, which, when stirred, emits gases and a stench almost unbearable, is a menace to human health as well as to fish life. An instance of this kind was found this year on the Shawsheen River, where dead or dying fish floated down stream or lay rotting along the banks, — indisputable evidence of the effect of sawdust pollution, in the face of which the claim that the pouring of sawdust into a stream is harmless to fish life must be dismissed as misleading if not purposely fictitious.

The Shawsheen River was investigated by the commission and the conditions found there, as a result of filling the stream with sawdust, fully demonstrated the evil and the peril of continuing this practice. Although the summer was far from oppressively hot, as is well known, the masses of decaying sawdust that lay on the bottom, or that had been swept by the current against the sides of the stream, constantly emitted gas, which rose in bubbles to the water surface and burst. The stench of the sawdust was remarkable when the mass was stirred, and one could not wonder that the water was too heavily charged with poisonous gases for fish to live in it.

financially benefited as a consequence of the enforcement of a measure believed by most of those concerned to be a positive hardship. This phase of the adaptation of man to new conditions, and the acquirement of profit where no trade was deemed feasible, is at least interesting, especially when considered in the light of a desire to inflict as little hardship as possible upon those most directly affected by the law, without, at the same time, shirking either duty or responsibility.

It is not practicable within available limits to discuss here the questions which cause a marked divergence of view concerning the individual and public rights involved in this question. Were it otherwise, a consideration of this subject might be justified, for the reason that a clearer idea of relative rights might thus be gained by many, and no doubt much bitter feeling that now exists toward the law, believed by some to have been enacted solely in the interest of the idle or rich and against the interests of those struggling to earn their bread by the sweat of their brow, would be modified or entirely removed. Nevertheless, hope may be cherished that a better feeling may develop; that even the farming communities may realize the advantage of preserving the purity of the streams, and likewise that law for the prevention of stream pollution was intended for the greatest good for the greatest number and is being enforced with that end in view, as well as a matter of duty.

Pond and Brook Fishing. — The notes extracted from the reports of deputies in various parts of the State, and classified under three heads, embody much information concerning the condition of fish and fishing in the several localities of the eastern, central and western sections of the Commonwealth. They also indicate unmistakably the influence of artificial stocking with fish, and the regulations imposed by the commission under special acts. As will be seen, an increase of fish is noted in a large majority of cases, and since the restoration of life in our inland waters is almost wholly dependent upon fish culture and the enforcement of protective laws, the importance of those phases of the commission's work will be apparent. If, instead of being more or less barren and unattractive, our ponds and streams can be brought to a condition

which will cause them to yield large quantities of food, in addition to furnishing much healthful recreation, it is difficult to over-estimate the public benefit to be derived from the change.

Among the statements made in the extracts which follow, those relating to the pike perch are peculiarly noteworthy. In introducing this species into our ponds in 1900 and 1901 there was of necessity an element of doubt concerning it. No one could say with certainty that it would live in the ponds, with their conditions of temperature, etc., while it was impossible to be free from apprehension of the effect of predatory attacks by other species, notably the pickerel. If, then, the statements made concerning the pike perch can be fully credited (and we see no reason for doubting them), there is reason for much encouragement, so far as its introduction is concerned; for not only is it a good food and game species, that attains a considerable size, but it is prolific and can be bred in large numbers. When adult fish become reasonably abundant in our ponds it will be easy for the commission to collect all the pike perch eggs it needs, and then many millions of fry can be produced from Massachusetts fish for stocking the ponds. While this result may not be realized immediately, it is far from visionary to expect it in the not distant future.

The smelt and smelt fishing is included under this head for the reason that this species is anadromous, running into the brooks during its spawning season, and also because in recent years it has attracted anglers to a considerable extent. Its unusual abundance this year, and its well-known excellence as a food product, have no doubt caused it to be angled for by sportsmen to a larger extent than common.

The first group of extracts which follow deals with conditions in the eastern section of the State:—

White perch are large and plentiful.—D. R. SIMMONS, Cochesett.

There has never been for many years such an abundant catch of smelts by fishermen and sportsmen as there has been for the present season. It has been reported that men have caught as high as seventy-five pounds in one day with hook and line.—CHARLES N. HUNT, Quincy.

Smelts have been very plenty.—FRANK SERRILLA, Boston.

The run of smelts was about the same as last year, although the catches have not been as large. — W. I. JAMES, Hingham.

Bass, pickerel, perch and smelt fishing have been good, but trout are very scarce. — OTIS THAYER, Quincy.

Trout fishing was very good this season. Bass fishing was most excellent and of good size. — ETHAN BOTHWELL, Northborough.

Fishing here has been good this year. — GEORGE WILLIAMS, Lynnfield.

Some excellent catches of pickerel and black bass were made [in Horn Pond] in the early part of the season, showing favorable results from closing the pond through the colder part of the year. From my own observations, and also those of others, the pike perch placed here [Horn Pond] last year have lived, and have shown that the water is adapted to their growth. I have noticed the apparent freedom they seem to enjoy from destruction by larger fish. They have grown to five inches or more in length for the first year. — FRED J. BROWN, Woburn.

The trout that were put in our streams are doing remarkably well. I have caught them weighing over nine ounces apiece, and within a week I saw in one spring nineteen that would measure from five to eight inches in length. — HERBERT E. MCINTIRE, Reading.

The trout which have been placed in our streams are doing well in most of them. — L. E. REED, South Acton.

The pike perch that the pond [Wenham Pond] was stocked with are growing fast, and will no doubt be a great addition to the fishing there. — FRED S. KNOWLTON, Wenham.

A few smelt have been caught in Gloucester harbor and Squam River this season. In the ponds here perch are plentiful, black bass and pickerel fair. Trout fishing is fair. — WILLIAM W. NIXON, Gloucester.

Fishermen report fair luck. — E. T. WILDES, Georgetown.

The fish in the Great Pond are numerous and are still increasing. There have been some very nice black bass, pickerel and white perch caught this year. — WILLIAM J. TOOHEY, North Andover.

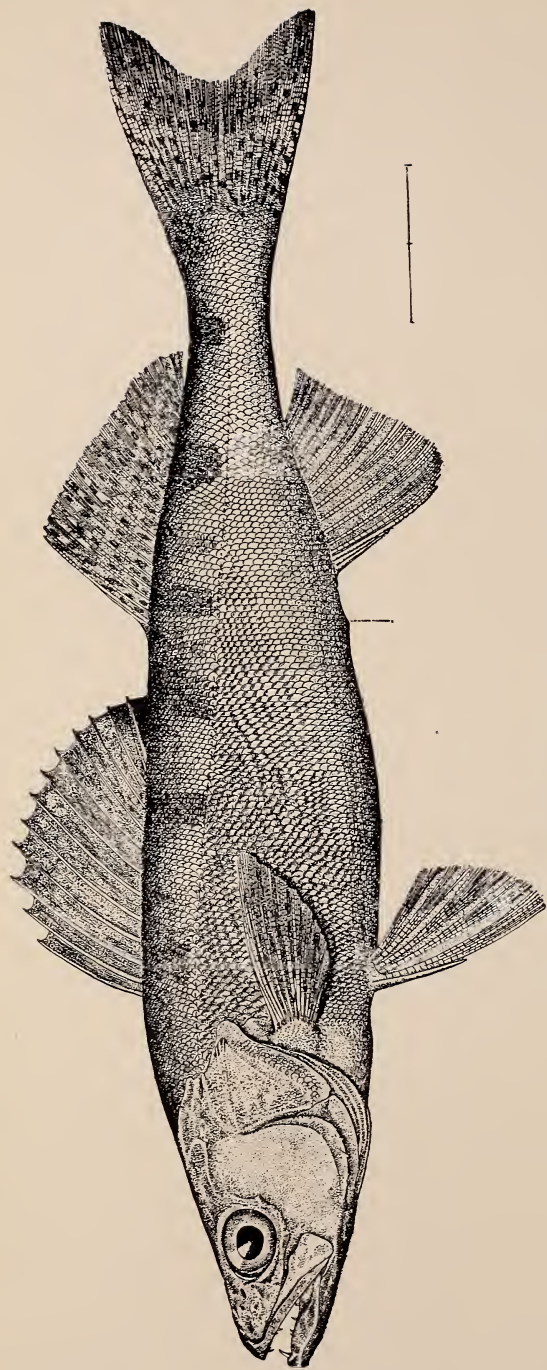


Plate IV.

STIZOSTEDION VITREUM. — Pike Perch or Wall-eyed Pike.

Argelia Brook has not been fished this year and is full of trout. —
LOUIS C. GORDON, Groveland.

I have found very many trout in some of the brooks. — A. J.
RAUSCH, Lawrence.

Trout fishing has been very fair. There have been some good catches. — A. J. KENNEDY, Lancaster.

The following excerpts from the Worcester "Telegram" of April 6, 1902, are of interest here, since they show the favorable conditions at the opening of the fishing season in the central section of the State: —

The first week of the trout season has nearly passed, and easily sustains the record promised on the opening day. The season has thus far shown the best opening of any trout season in the memory of Worcester fishermen. With ordinary weather, the coming weeks will be better than the first, and the season will have an earlier and better opening than ever.

But taking everything into consideration, what is and what might have been, trout fishermen must acknowledge that a better opening was never given them, and a better one could not be asked without making a demand that is not consistent with what should be looked for in April.

Not only has brook fishing been excellent, but fishing at the lake has proved far beyond expectations.

Last year none were caught, and those who did not take kindly to the plan of stocking the lake laughed at the results. But the catches reported this week show the work of the commission of inland fisheries and game was beneficial, and that there are many large-sized trout in the lake.

Deputies report as follows: —

The trout fry I put into the brook are doing finely, — better than I expected. — GEORGE POGUE, Grafton.

Trout are very scarce. — DANIEL A. WARREN, West Upton.

Trout fishing has been excellent, and some large catches have been reported from streams stocked by the commission. The work done by the commission in stocking ponds, lakes and brooks with suitable fish is meeting with much approval by citizens, and they are just awaking to the fact that it is for their own interest the work is

being done. I predict that, although the output from the hatcheries this year has been a record breaker, the number of applications which will come in next season for restocking ponds, lakes and brooks will be double in number. — JOHN F. LUMAN, Palmer.

I find trout very plentiful, and some fine strings have been taken in the western section of the State. — DENNIS SHEA, Ware.

Trout were plentiful this year and they should be still more abundant next year. — FRED S. CASAVANT, Gardner.

Trout, bass and pickerel fishing has been excellent. — WM. G. NICHOLL, Northampton.

The following extracts are from the western section of the State : —

Trout fishing was better this year than last, there being a good number of large trout caught. — M. J. CRANSON, Buckland.

Trout fishing was the best this year in the mountain streams that it has been for several years, and the season closed with the brooks well stocked with trout of good size. — L. E. RUBERG, Hoosac Tunnel.

Deputy A. M. Nichols of North Adams, in a postscript to a letter dated July 12, 1902, made the following statement : —

While out at South Williamstown to-day I fished for trout for a little while in the New Ashford stream, and out of one hole in about three minutes I caught three trout, each weighing one-half pound and measuring eleven inches in length. And still they say there is no trout over six inches in length in Berkshire.

In his annual report he says : —

The trout season has been one of the best that we have had in the western part of the State in years, especially in Berkshire County, where I have seen more large trout and larger strings than in any other section. The sportsmen are greatly in favor of the six-inch law in Berkshire the same as the rest of the State.

On August 17 he wrote : —

They are now getting nice strings of bass in southern Berkshire. A Mrs. Hyde of New York a few weeks ago caught a six-pound bass at Stockbridge Bowl. Mr. Parker of Boston got one at Lake Garfield weighing four and a half pounds.

FISHERIES.

Notable Features of the Year. — In the varied history of the sea fisheries of this State there has seldom been a year more remarkable for notable features than 1902. Some of these are ascribable to natural causes alone, while others are wholly artificial, and, for the most part, of a character which indicates progress and justifies anticipations of success, providing the fisheries are not handicapped by governmental action.

The meteorological conditions prevalent in the region chiefly frequented by our fishing fleets during 1902, and especially in that period of the year — March to November — ordinarily termed the “fishing season” (within the limits of which alone several branches of fishery can be pursued, notably the mackerel industry), have been extraordinary, if not phenomenal, and it is questionable if any such remarkable summer weather has been seen since the ever memorable summer of 1816, when ice, frost and snow were not unknown in the mid-summer months.

It is true that the early spring months of this year were mild in temperature and not exceedingly windy; but all through the summer, beginning in May, there was a remarkable prevalence of easterly winds, with frequent blows or gales, varied by heavy rain storms, the whole forming a combination which badly interfered with nearly all kinds of fishing, and proved a serious hindrance to certain branches of fishery. More extended reference to this will be made in connection with the discussion of the mackerel fishery.

The reintroduction of steam in the prosecution of the mackerel fishery is one of the most important events of the year. Allusion is made to the building of the schooner-rigged, wooden, screw steamer “Alice M. Jacobs,” of Gloucester (Fig. 2, Plate VI), which was launched in the spring and got away rather late for the early southern mackerel fishery.

Inasmuch as this marks a new era in the deep-sea Atlantic fisheries from this State, and because it is an event fraught with larger consequence than might at first appear, it seems desirable that brief mention should be made of a previous attempt to employ steam in the New England mackerel fishery.

In 1885 the wooden, schooner-rigged, screw steamer

"Novelty," of Portland (Fig. 1), was built at Kennebunkport, Me., expressly for the mackerel fishery. She was commanded by Capt. Hanson B. Joyce, one of the most noted skippers among the mackerel fishermen of New England.

The vessel was 150 feet long between uprights, 27 feet beam, 11.2 feet depth of hold, 291.5 gross tons and 197.46 tons net tonnage. Her nominal horse-power was 300 and her speed about 8 or 9 knots under steam alone. She had a moderate sail area, which served to cruise slowly under or as



FIG. 1. — Mackerel Fishing Steamer "Novelty."

auxiliary power when sails could be used on a passage. She was fitted to carry two seine boats and two seine crews, and in every respect but two seemed well adapted to the purpose for which she was built. Her steam power was too limited for one thing, as judged by recent standards, but this was less of an objection than the fact that her deck room was much restricted by the long deck house over the engines and boiler. In this respect the steamer "Alice M. Jacobs" is a distinct improvement over the "Novelty," and also has greater speed, notwithstanding her boiler is below deck.

What fortune might have attended the "Novelty" under normal conditions may now only be conjectured. Unfortunately, at the time of her advent the mackerel, true to its reputation for erratic habits, suddenly became scarce, after a season of phenomenal abundance, and for a series of years the catch fell off to a remarkable degree. The greatest skill could not succeed in making a steamer pay under such circumstances; the enterprise had to be abandoned, and the vessel was finally sold to the Haytians for a war cruiser.

The experiment was not, however, entirely lost, for it taught useful lessons, and under happier auspices there can be no doubt that it would have proved successful, and the utilization of power-driven vessels in the Atlantic food-fish fisheries would have been advanced several years in time.

The specially distinctive features in the "Jacobs," which seem to deserve notice when comparing her with the "Novelty," are the following:—

1. She has a quarter deck sufficiently raised above the main deck to admit of the boiler and engines being installed without high deck houses over them, thus securing the maximum of deck room, which is always a matter of large consequence to a vessel engaged in the mackerel fishery. This additional height of deck aft also adds materially to the cabin accommodations.

2. The "Jacobs" is equipped with an electric plant which, in addition to serving various other useful purposes, is of special importance when catches of mackerel must be stowed away in the ice house at night.

3. The pilot house of the "Jacobs" is near the bow of the vessel. Its location there, while open to objection on other accounts, was deemed necessary by Captain Jacobs, her owner and commander, in order that it should obstruct the deck as little as possible, and also that the important evolution of going alongside a seine boat and seine could be conducted with a better view of the boat and net than might be obtained from a pilot house placed further aft. In this respect the precedent set by the menhaden fishermen has been followed.

The "Jacobs" is not so large as the "Novelty" was, but is large enough for the purpose for which she was built, being 141 feet 7 inches long over all, 24 feet beam and 12 feet depth

of hold, with (estimated) speed, under steam alone, of 10 to 11 knots.

It is only just to say that her advent and success may well be watched with much interest, notwithstanding she has been badly handicapped by the unfavorable weather that has prevailed much of the time since she first sailed, and the expense of running her has been unduly enhanced because of increase of the price of fuel, due to the famous coal strike for which this year is noted.

The addition of a new steel fishing steamer to the fresh halibut fleet of this State is an important event, to which reference is made elsewhere.

The extensive employment of naphtha dories in the coast fisheries is one of the most notable occurrences of the year, since our fishermen have profited largely thereby, and thus have had an instructive lesson in the advantage to them of using power-driven craft in the market fishery. This motive power has been applied to a number of shore craft larger than dories, and also to several auxiliary schooners, built primarily for the mackerel fishery. All of this indicates the growing tendency of our fishermen to recognize the demands of the age, which call for sustained speed, regardless of fluctuations of wind, and the elimination of uncertainty in the transportation to market of perishable fares of fish.

Some of the largest stocks ever earned in the sea fisheries make the year a notable one, since these have been the result of extraordinary catches and the market demand due to the general prosperity of the country.

A revival of the old-time prosperity in the sperm whale fishery is one of the most remarkable happenings in the sea fisheries of this State that has occurred in many years.

The profitable and somewhat extensive utilization of certain products heretofore considered comparatively of little value suggests a distinctive advance in the intelligent direction of our fisheries, which is creating a better appreciation of and demand for materials heretofore not valued at their true worth.

The negotiation of the so-called Hay-Bond fishery treaty, whereby, if it is ratified by the Senate, fishery products may be admitted free from Newfoundland to the markets of the

United States, is fraught with greater possibilities of influence upon the fisheries of this State, and indeed of all New England, than anything that has transpired in many years; it may well be considered the leading event of the year, so far as its probable influence upon the deep-sea fisheries is concerned.

The strike at Gloucester of fish skinners and packers is believed to be without parallel in the history of the fisheries of this Commonwealth, in which labor troubles of this kind have heretofore been unknown.

Statistical Returns. — There has been considerable improvement in the statistical returns of coast fisheries received by the commission this year. This is due chiefly to a letter of instructions sent to each fisherman or fishing company, with the blanks for returns. The fact that this letter invited special attention to the penalty for not making returns of certain fisheries, and that it clearly indicated the duty of the commission to enforce the penalty if the law was not complied with, also probably caused the returns to come in more promptly than heretofore.

That a larger number of fishermen than usual, and especially of lobster fishermen, have reported this year, is doubtless due to the extra effort that has been made to ascertain the names of those who should make returns, so that blanks and letters of instructions could be sent them. A personal canvass of the coast has been made by deputies of the commission, and the name and address of every net and lobster fisherman not already on the list have been ascertained, so far as practicable. So far as this bears on the lobster fishery, and the number of persons employed therein as fishermen, it is probable the data in possession of the commission are more nearly accurate than have heretofore been obtained by any agency.

It is regrettable that there are those so entirely regardless of law, or the requirements of the State, that some have failed to comply with the statute requiring statistical returns of certain fisheries. It will probably be necessary to take legal action in these cases, if the law is not to be ignored altogether, but it is assumed that there may be no need of a repetition of this in the near future. It is fair to anticipate that, as a result of this probable action, whereby law breakers may be taught a

useful lesson, and because of the efforts in other directions, the statistics gathered will be as nearly correct as it is reasonable to expect they should be, and therefore a proper basis for intelligent consideration of these industries.

Shore Weir and Net Fisheries. — So far as the appearance of the mackerel in inshore waters is concerned, this year does not differ much from last season. The hopes and anticipations of the shore fishermen, prompted as they were by the appearance of large numbers of mackerel in the early spring on the southern fishing grounds, were again doomed to disappointment. The rough weather of late spring and early summer may account for a much smaller catch of mackerel on the off-shore grounds than otherwise might have been the case, but it will not explain why the mackerel kept away from Cape Cod Bay or other inshore waters, nor has any other satisfactory explanation been offered, so far as we are aware, for this continued absence from the coast of large bodies of this species. All that can be said is that this is in harmony with the well-known erratic habits of the mackerel, the movements and abundance of which vary so greatly, generally from causes entirely unknown to man, that the most expert are unable to predict correctly concerning it.

The horse mackerel or tunny has now become highly prized as a market fish, selling for prices rivalling those paid for the best halibut or other choice species. We are informed by Capt. Atkins Hughes, of North Truro, that it has sold for \$10 to \$20 each this season. The tunny is like all of the mackerel tribe in the uncertainty of its appearance. It has been rather scarce this year, as well as for the previous two years, although there have been seasons not long ago when it has been abundant in inshore waters. At that time it was less fully appreciated than now as an article of food. Its return to inshore waters in abundance will not only add materially to the income from the shore fisheries, but there is reason to anticipate that the species, which is similar to the so-called "leaping tuna" of the Pacific, might be eagerly sought by anglers, whose presence in the seaside villages should prove advantageous to the coast populations.

The bluefish, another of the mackerel family noted for the

erratic traits that distinguish this group of fishes, has been rather scarce this year on some of the inshore fishing grounds. Except for its well-known peculiarities, its almost entire absence from Buzzards Bay (where it is supposed to be protected by the prohibition of all net fishing) might be considered remarkable, especially in view of the fact that it was reported to have occurred on some other sections of the coast in considerable numbers, notably at Nantucket.

The squeteague or weakfish has still continued in great abundance, and has been one of the important objects of inshore fishery, especially by the weir men.

The bait species — herring, alewives and squid — have been among the most important objects of inshore fishery. Although quantities of these species are utilized for food, even the squid now being in demand to some extent for that purpose, a large percentage of herring and squid and many alewives are sold for bait. The importance of the bait fishery on the shores of this State is of larger importance in making possible the prosecution of the deep-sea fisheries than is generally understood, and it is practically certain that it will become of greater consequence with passing years. This assumption is based on the fact that every year shows a greater demand for fresh sea fish. As a consequence, the ocean fisheries will be prosecuted more extensively on grounds within easy reach of the home markets and less on distant banks. Therefore, home-caught bait will be required in larger quantities, and it is probable there will be less dependence on bait obtained in British provincial ports. Indeed, conditions are conceivable that will make desirable the entire dependence of the deep-sea fishing fleet upon a home supply of bait, and a consequent abandonment of the practice of seeking bait in foreign ports. In that event — and stranger things have happened in this age of progress — these bait fisheries on our own shores will become of paramount importance.

A feature of the weir and net fishery this year specially worthy of mention is the larger utilization for food purposes of certain species of fish that heretofore have been deemed of little value for the table.

It is evident that anything of this kind which can be done may add materially to the income from fishery, and to that

extent it places the industry on a safer and more profitable basis.

We are creditably informed that the whiting or silver hake (*Merlucius bilinearis*) caught in the Cape Cod pound nets this year has become an important commercial product instead of being mostly thrown away, as was the case a short time ago. This fish is sweet and nutritious, but will not retain its firmness long after being taken from the water, hence its value as a fresh-fish product has heretofore been inconsequential. It having been suggested, however, that the silver hake might meet with favor as a salted product the experiment was tried with good success. The result has been that fish of this species have been purchased in large quantities from the weir men at \$1 to \$2 per barrel, as taken from the water; subsequently the fish were beheaded, split down the back and salted in brine, in the same manner as mackerel. Apparently a good demand has been created for this product, and future years may see large sales. It is possible that the silver hake may prove valuable as a kippered fish, or cured like finnan haddies. If so, its advent in this field will be an important innovation, for it is abundant,—has often been superabundant, to the great annoyance of the weir men,—and its low cost will place it within the reach of all.

Among the fish utilized to a considerable extent is the menhaden, which, for the first time, so far as we are aware, has been sold fresh in large quantities for food. It has been commonly seen in the markets of Boston, and the demand for it is evidenced by the fact that the writer was informed that one stand alone sold an average of about 200 menhaden a day, at ten cents each. If this is a fair basis for an estimate, the consumption of this species for food in greater Boston must be considerable, since there are large numbers of fish markets in the city proper and its suburban municipalities.

Perhaps the most remarkable feature of the shore fishery this year has been the building of a large fleet of dories fitted with gasoline or naphtha engines. These boats range from 25 feet or less to 35 feet or upward in length. They are round-bottomed dories, with considerable over-hang at the bow, narrow, flat bottom, round bilge, flaring sides, a narrow, V-shaped,

strongly raking stern and skag. As a rule, a short space is decked at bow and stern and washboards extend along the sides. They are generally lap-streak built, few if any being carvel built. The power varies somewhat, according to the ideas of the fishermen and the speed required, but generally a 3 horse-power engine is put on a boat 25 feet long, and a 4 horse-power engine on a boat 30 feet long.

The accompanying plans (Plate V.) show the general features of one of these boats built at Lynn, Mass., the present year by R. M. Benner, now of East Boston. This was a clinker-built, round-sided dory, with the following proportions: Length, over all, 32 feet; on bottom, 24 feet; beam, 7 feet 8 inches; depth amidships, 30 inches. She was fitted with a 4 horse-power naphtha engine, and her speed is approximately 7 knots. These boats are usually planked with three-fourth inch cedar; the frames, stem, stern and bottom are hard wood, oak being commonly used.

While boats of this type have been employed generally in the shore fisheries, they seem to be most conspicuously adapted to the cod fishery from Provincetown, the beam trawl flounder fishery at Cape Cod, and the night herring fishery with torches.

For many years during the winter season the cod fishery has been pursued in dories from Provincetown. The dories used were, as a rule, 15 feet long on the bottom and about 20 feet long over all. They were fitted with sails, — usually a single sprit sail, sometimes a jib also, — and with a favoring wind these served as an important auxiliary power. But the fishing ground commonly resorted to lies off Race Point, six to ten miles from the harbor, while the course to it, owing to the curve of the Cape, must necessarily be nearly circular. Thus, whatever the direction of the wind, such a boat must be rowed more or less, either going to or returning from the fishing ground. The progress is therefore slow and laborious under the most favorable conditions, and, inasmuch as calms often prevail in winter when small boat fishing is practicable, the labor is frequently enhanced thereby while the speed is reduced. For this reason it has been common for the fishermen to arrive late on the fishing ground, quite worn out with their exhaust-

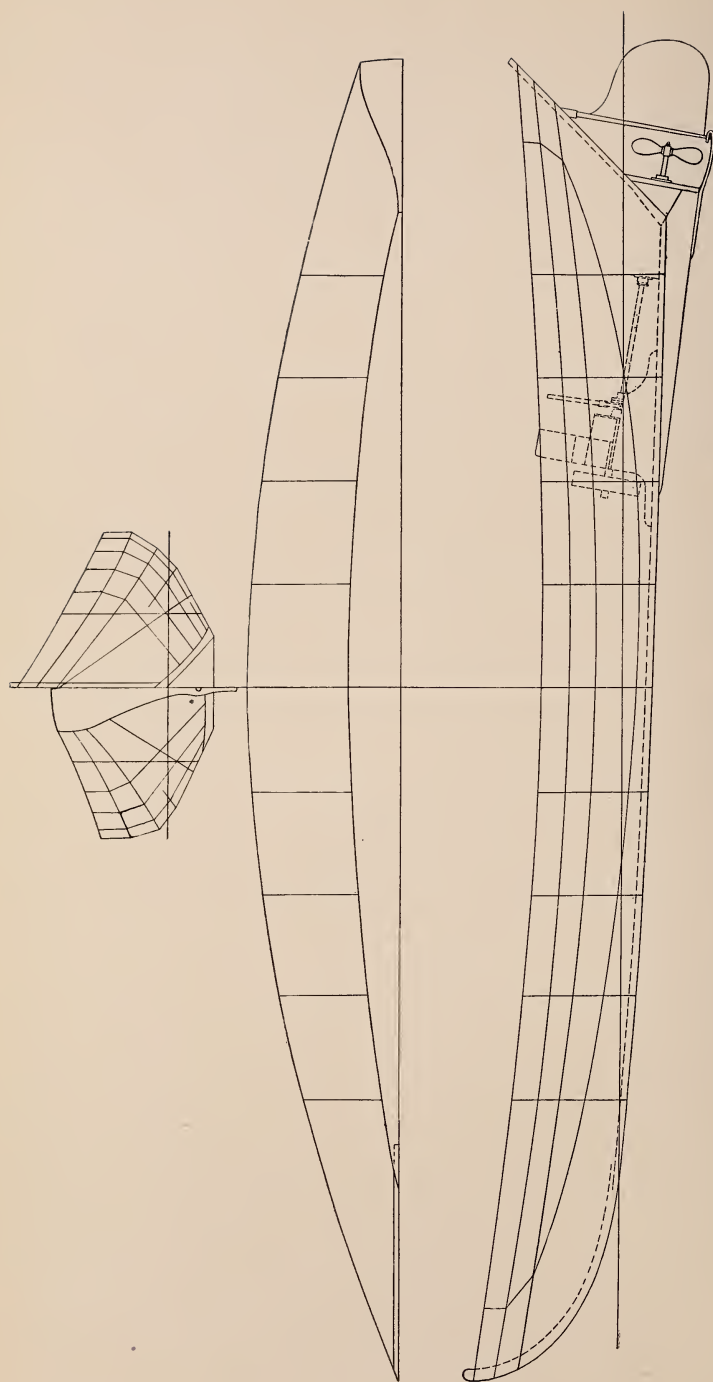
ing labor at the oars, and less fitted than they otherwise might be for the work of setting and hauling trawl lines.

However, despite the importance of this, it was of less consequence to the welfare of the fishermen than when their lives have been imperilled by a sudden increase of an offshore wind, which made it nearly impracticable for them to reach the shore anywhere and thus save their lives, not to speak of returning to the harbor with their catch.

The adoption of the power-driven dories has changed all this. The fisherman, knowing the speed of his boat, can calculate to a nicety the time required to reach the fishing ground; beside, it is not necessary for him to start so early. His boat is larger, too, and far safer, especially with a fare of fish on board, while the knowledge of her ability to reach the harbor under trying conditions gives greater confidence to brave threatening weather, thus increasing the catch considerably. In addition, the men reach the fishing ground without having overtaxed their strength; they are always there as soon as it is light enough to work, if the morning is fine, and every advantage in fishing is thus assured. And when the lines and fish are on board, and the boat headed for the harbor and market, the time of her arrival is known almost to a minute. Even head winds make little difference, and almost no heed is given to thick weather. The terrors of this winter boat fishery are thus minimized, and financial success has been enhanced to a remarkable degree.

The success of the Provincetown shore cod fishery this year is reported to be beyond precedent. Cod were abundant, the prices good, and the returns unusually large. An episode of the fishery came to our knowledge which emphasized the possibilities of the new type of boat as well as of the fishery.

One morning the fleet of boats lay waiting around the weirs for a supply of bait; but when the nets were lifted there was no bait. Squid, which had been relied on theretofore all through the late fall, had apparently moved off shore or had left entirely. A single bucketful of squid constituted the entire catch, and this was only a fraction of the supply required by a single boat under ordinary conditions. All were eager to get the lot, nevertheless, and so the squid were put up at auction. They were finally sold for the unheard-of price of \$4! And it is no



Naptha Fishing Dory. Designed by R. M. Benner.

less remarkable that the two men who ventured to make the purchase landed fish enough that day to earn more than \$60.

The power-driven boat is almost an ideal craft for torching herring, especially when fitted with an electric light. She is equally well adapted to towing a small beam or otter trawl, and doubtless will soon supersede sail boats in the flounder fishery.

Their high earning capacity and their comparatively low cost—ranging from \$400 to about \$800—insure their almost universal adoption in the shore fisheries, which, it is reasonable to expect, will be immensely benefited thereby.

The shore flounder fishery has grown materially in importance in recent years. The increasing appreciation of flat fish as an article of food has led to this, and has also resulted in the introduction of new features in the industry.

The use of the beam trawl, undertaken a few years ago in a very limited way on small boats at Cape Cod, has become more general now, and the utilization of power-driven boats to tow the trawls, such, for instance, as the pound-net or weir launches, has shown more clearly than ever before what may be accomplished in this particular fishery by the adoption of proper methods.

It is pertinent to state here that, in order to attain the highest success, it will be necessary to substitute the otter trawl for the beam trawl, the latter device having now become largely obsolete in countries where net trawling is extensively prosecuted. In Great Britain, for illustration, the otter trawl is exclusively used on the steam trawlers. The limits of this report will not admit of a detailed description of the otter trawl. It must suffice here to say that its general features and purpose are similar to those of the beam trawl, it being a large, purse-shaped net that is towed over the bottom for the capture of bottom-feeding fish, especially various species of flat fishes. It differs from the beam trawl in having no beam, its mouth being spread by the action of oblong pieces of plank called otters,* that are attached to the extreme wings of the net. What are termed bridles are fastened to these in such a way—very similar to the way in which a string is fastened to a kite—that the otters, when towed by the hawser that is bent to the

* Large otters are made of several pieces of heavy planks bolted together.

bridles, shoot out in opposite directions, and thus stretch the wings of the net as far apart as possible, so that its mouth will cover the largest area practicable as it moves along the bottom. The fact that the otter trawl can cover a much greater surface of the sea bottom than a beam trawl, that it would be practicable to operate from a boat or vessel of approximate size, makes it much more effective for the capture of fish. Many claim it will catch double the fish that a beam trawl will. It is also much easier to handle, and usually less expensive, all of which makes its introduction desirable. It should be specially advantageous for boat fishing.

Many Italians have recently engaged in the flounder fishery from Boston, and a large fleet of their boats can be seen daily at T wharf, where they resort to sell their catch. The fish are taken chiefly on trawl lines in the lower harbor or a short distance outside, but always within easy reach of the market. At present the large fleet employed in this fishery is composed of open boats of various types, the sail dory predominating. They are generally old craft and to that extent ill adapted to the purpose they are used for. But the fishermen are thrifty, disposed for the present to get along with cheap boats, and to endure many discomforts and hardships that might be minimized by having better craft. No doubt the latter will be utilized in time, and the day may not be distant when well-built power-driven boats, with some cabin accommodations, may find profitable employment in this fishery from Boston, chiefly because they can go further afield to seek more prolific fishing grounds, or can use more effective devices for the capture of flounders.

The shore herring fishery, which employs many boats in the fall, has been less prosperous this year than usual. There has been a marked scarcity of large herring on the inshore grounds, where they are caught chiefly by torching at night, and the catch has been chiefly small fish. Even the latter have not been abundant, and the season's work has not been satisfactory on this account. This scarcity of fall herring off the coast not only affects the fishermen directly engaged in catching herring, but it unfavorably affects those branches of deep-sea fishery that require freshly caught herring for bait.

Lobster Culture and Lobster Fishing.—The following reports from the superintendents of the fish-hatching stations of the United States Fish Commission at Gloucester and Woods Hole present in detail the facts concerning the artificial propagation of the lobster within the borders of this State :—

UNITED STATES COMMISSION OF FISH AND FISHERIES,
GLOUCESTER, MASS., Oct. 7, 1902.

Capt. J. W. COLLINS, *Chairman, Board of Commissioners on Fisheries and Game, Boston, Mass.*

DEAR SIR :—In response to your request of the 3d instant, I submit herewith a brief report of the propagation of lobsters at Gloucester, Mass., station during the current year.

As in past seasons, our field of collections covered the principal fishing centres between Cape Ann and Cohasset, Mass. Favorable weather during April enabled us to start operations somewhat earlier than has been possible the past few seasons. During April and May the receipt of egg lobsters was larger than usual, but after June 1 they dropped off considerably and continued small for the remainder of the season.

From Massachusetts waters we collected 2,020 egg lobsters, which yielded 28,897,000 eggs; from these were hatched 26,870,000 fry, which were distributed at various points along the shore, from Ipswich Bay to Cohasset, Mass. In addition to these, 8,170,000 fry, obtained from eggs taken outside the State, were also planted in these waters, making the total fry planted in Massachusetts waters 35,040,000.

We also received from Maine and New Hampshire 3,881 egg lobsters, which yielded 54,521,000 eggs, from which were hatched 47,650,000 fry.

Very respectfully,

C. G. CORLISS, *Superintendent.*

UNITED STATES COMMISSION OF FISH AND FISHERIES,
WOODS HOLE, MASS., Sept. 30, 1902.

Capt. J. W. COLLINS, *Chairman, Board of Commissioners on Fisheries and Game, Boston, Mass.*

DEAR SIR :—I beg to submit the following brief report of the work done in propagating lobsters at this station during the season of 1902.

About the middle of April arrangements were made for securing egg-hatching lobsters from the fishermen in local waters and also in Scituate. At Plymouth, where we usually get from 1,000,000 to

2,000,000 eggs, the prospect was so poor that only about four men set pots, and we were forced to abandon this territory.

The fishermen in local waters were late in getting started, and after their pots were set the continued windy weather made it impossible for them to tend their gear with any degree of regularity.* Eight or ten men from New Bedford set a few pots each at the beginning of the season, but soon abandoned lobstering to engage in other branches of fishing.

In all, 341 egg-bearing lobsters were collected in Massachusetts waters. These yielded 4,344,000 eggs, a decrease of 26 per cent. from last year. This decrease is caused by the loss of eggs from Plymouth. The receipts from the territory included in Vineyard Sound and Buzzards Bay show an increase of 24 per cent. over last year. About 370,000 of these eggs were used for experimental purposes, and from the remainder 3,482,000 fry were hatched and planted in the waters of this State.

In accordance with our usual custom, collections were also made from Connecticut and Rhode Island waters, the total number of eggs received at the station being 20,480,000.

Very respectfully,

E. F. LOCKE, *Superintendent.*

The foregoing statements show an increase in the output of lobster fry in the waters of this State of $3\frac{1}{2}$ per cent. above that of last year. As in previous years a considerable percentage of the fry thus planted was obtained from lobster eggs brought from other States. The increase, however, is due entirely to the opportunity for collecting egg-bearing lobsters in April and May, when exceptionally fine weather prevailed, but even this did not suffice to add to the Woods Hole collections, for there was a distinctive falling off in the output of fry there, amounting to 1,458,000, or nearly 30 per cent.

The unusual mild spring weather, which enabled the collecting launch to safely patrol the coast from Cape Ann to Cohasset in the two spring months, made it possible to increase the supply of egg lobsters at Gloucester, and the consequent output of fry, as compared with last year.

* "The continued windy weather," referred to by Mr. Locke, must have occurred in late May and thereafter. It is well known the three summer months were windy and rough, but April and May were remarkably fine, with more moderate winds than usual.

But while the total results exceed those of 1901, they fall below those of 1900, despite the fine weather and the effort put forth, as will be seen by the following tabulated statement, which presents with exactness the comparative figures for the three years : —

*Table showing Comparative Statistics of Lobster Culture by the United States Fish Commission at the Massachusetts Coast Stations in 1900, 1901 and 1902.**

	1900.	1901.	1902.
Number of egg lobsters, . . .	2,828	2,045	2,361
Eggs obtained,	40,231,000	26,679,000	33,241,000
Fry hatched,	36,449,000	24,140,000	30,352,000

The special feature of these reports is the statement by Mr. Locke that lobster fishing at Plymouth was practically abandoned, to such an extent at least that he gave up the attempt to collect eggs there. The important question in this connection is, does this foreshadow a more general diversion of labor to other pursuits and a consequent decline in the lobster fishery?

It is not the purpose of this report, however, to enter into anything like an extended discussion of the lobster fishery or what is needed to produce more desirable conditions. Year after year, for a long time, this commission has availed itself of the opportunity to present in its annual reports many interesting facts concerning the lobster, its decadence, and the necessity of further protecting it, in order to preserve it from too rapid decimation in the waters of this State. Recommendations, based on studies of the lobster and the fishery for it, have been made, but these have generally been met by determined opposition, until a "lobster fight," resulting from attempts to abolish protective legislation or to secure better laws, has become almost a perennial incident of the sessions of the General Court. While some progress has been made

* The figures given in this table relate solely to egg-bearing lobsters gathered in Massachusetts waters, and the eggs and fry obtained from them.

as a result of these struggles, and the ultimate commercial extinction of the lobster has been somewhat delayed thereby, it is an open question how long this commission will be justified in contending with opposition and indifference in the effort to preserve a valuable sea animal and the industry based upon it. It is increasingly evident that adequate measures must soon be taken, if the lobster is to be preserved as a commercial factor in New England, and the time has already arrived when it seems that little which really promises satisfactory results can be accomplished without co-operation on the part of the several coast-bordering States and the British maritime provinces.

If nearly uniform legislation or regulations can be secured for the lobster-producing States and provinces much can be gained, especially if those enactments are based on knowledge, practical common sense and scientific principles, and are not the product of selfish interest or political expediency. It is high time that a question so important as this, involving as it does the welfare of the general public of the United States and Canada, should be removed from the influences which consider only temporary personal advantage, and be put on a higher plane. With this end in view, authority will be sought by this commission to participate in a convention of State commissioners, if such can be assembled, to the end that all reasonable effort shall be made to secure such action on the part of the several lobster-producing States and provinces as may be best for the preservation of the lobster and the lobster industry.

Meantime, it is advisable to slightly modify some of the lobster laws of this State, in order that they may fulfil the purpose they were enacted for, but at present it seems inadvisable to go beyond this. It is certain that no benefit can result from the enactment of radical measures by Massachusetts alone, such, for instance, as a change in the laws permitting the catching of all lobsters less than 10½ inches in length, and prohibiting the capture of adult lobsters. The only result of legislation of this kind by a single State will be the substantial withdrawal of all protection, unless there is a prohibition of the sale or possession of adult lobsters, and anything of

that kind will necessarily interfere with trade and meet with the determined opposition of dealers, who may be able to get only adult lobsters from Maine and the provinces because of the laws or regulations in force there.

While there are probably those who will claim there is no appreciable diminution of the lobster, there is a multitude of evidence showing the contrary, if reliance can be placed on the statements made. Indeed, those engaged most extensively in the sale of short lobsters, in open defiance of law, relying on their expertness to evade the penalty of transgression, have had no hesitancy in saying that the lobster could last only a few years at the present rate, but they proposed to get all the profit they could until it is commercially exterminated. It would be easy now, as in previous years, to quote extensively regarding the decadence of the lobster, but a few extracts from letters and the press must suffice.

Mr. Samuel H. Benson of Plymouth, in his annual report of the number of lobsters caught and sold, makes the following statements:—

I have noticed a very much larger per cent. of short lobsters than in 1901, by actual count. In 1901, one lobster in seven was of legal length; in July, 1902, one in ten; in August, 1902, one in twelve; in September, one in sixteen.

This would seem to indicate a decreasing percentage of adult or legal-sized lobsters.

Mr. William R. Norris, a lobster fisherman of Bourne, says: “Lobsters were not very plenty this season.”

A Scituate despatch published in the Boston “Herald” of May 24, 1902, contained the following:—

Some of the fishermen have had to be content with less than 20 lobsters for an entire week’s fishing. Some of the most successful fishermen have caught as many as 50 counters in a week. . . . Many of the lobster fishermen at Scituate harbor, who have followed the business many years, have become so discouraged as to give up the vocation within the past week for mossing and farming. Six more followed their example to-day. . . . The general opinion is that a close season from July 5 to September 15, during which no lobsters should be allowed to be taken, is the only thing that will keep the lobsters from being exterminated.

The day previous the "Herald" published the following from Marshfield:—

Summer residents are finding it next to impossible to secure a toothsome lobster, and the summer hotels are obliged to cut out this item from their bills of fare.

A Salem despatch published in the Lynn "Item" of July 24 stated that "Lobsters are getting scarce along the North Shore, and hotels and restaurants are feeling the shortage."

The statistics of the lobster fishery for this year show an increase of men, traps, boats, etc., as compared with last year. This is ascribable to the fact that in previous years some of the fishermen failed to report. This year a canvass of the coast has been made, with the purpose of getting the name of every lobster fisherman, so far as practicable; the result is a considerable increase in the list.

A significant fact of the year has been the return, unfilled, of forty-seven of the blanks sent lobster fishermen. Statements accompanied thirty of these to the effect that the persons returning them had abandoned the lobster fishery, and the remainder were returned unclaimed or blank, which suggested the probability that the parties to whom they had been sent had also engaged in some other work, and in a large majority of cases had gone to some other locality.

The tabulated returns show an increase over the figures for 1901 of 79 men, 3,300 pots and 78,066 lobsters. The decrease in the catch per pot, which is unquestionably the surest index of the status of the lobster, still continues, the average catch being nearly 6 per cent. less this year than in 1901, which had considerably the lowest average up to that time in a period of fourteen years. When the average catch per pot has fallen from 84 lobsters in 1891 to 33 in 1902, no other statement seems necessary to indicate what may be the future of the lobster in this State, unless it is practicable to check this decadence more than heretofore has been possible.

The introduction of power-driven dories and new methods of evading the law have added to the difficulties of enforcing the statutes for the protection of the lobster. The naphtha dories now used by lobstermen are swift, the men in them are

alert, and the only way they can be prevented from supplying illegal lobsters to customers is to have a boat of the same type, swifter than they use, devoted to the enforcement of the fish and game laws.

The employment of a naphtha dory for the enforcement of the lobster laws, during a comparatively brief period of the present season, had a most salutary effect. While a number of arrests and convictions resulted from the use of this craft, her most important work was in chasing boats with illegal lobsters on board, and, as she could generally overhaul them, their crews, to escape arrest, were compelled to throw back into the sea hundreds or thousands of undersized lobsters, which otherwise would have been sold and consumed. This dumping of cargoes of lobsters into the sea was to dispose of the evidence of crime, and, aside from saving the immature crustaceans for the time being, it had a discouraging influence upon certain illegal dealers and others, who sometimes were compelled to throw away what they had paid for, or what they otherwise might have sold. Such was the fear inspired that every naphtha dory was viewed with suspicion by those guilty of illegal acts, and there is reason to believe that on one occasion at least a boat load of short lobsters was thrown into Boston harbor because the owner of them mistrusted the purpose of the occupants of another similar craft that was chasing him, although the owner of the pursuing boat was a notorious dealer in illegal lobsters.

It is, of course, impossible to even approximate the number of lobsters that were thrown overboard because of the naphtha dory employed, but 4,116 "shorts" were seized and thrown into the sea. The bulk of these were seized on steamers arriving from the provinces, but a considerable number were taken while in the hands of express companies. Everything practicable has been done to enforce the lobster laws, but it is evident there is still too much indifference regarding the lobster to make it easy to protect it as it should be protected.

Sea Fisheries.—The loss of life and property in the sea fisheries has for many years been one of the most important factors affecting the welfare of these industries. For, aside from the financial consideration, which at times has reached

large proportions, the loss of men, generally in the full strength of early manhood, frequently causes serious breaks in the ranks of experienced fishermen that may be difficult to fill, while more or less destitute widows and orphaned children remain to be provided for. The yearly record is a gloomy one at best, as evidenced by the fact that the annual average of drowned fishermen from Gloucester alone, during the quarter of a century ending in 1900, has been given as exceeding ninety-four, or a total of 2,354 men. Fortunately the loss this year, while exceeding that of 1901, is considerably below the average.

The record of this port shows a loss of 65 men at sea this year, who left behind, so far as known, 20 widows and 44 fatherless children.* Thirty-nine of these men went down in three schooners, the "Alva," "Iolanthe" and "Eliza H. Parkhurst," the latter being on her home passage, deeply laden with a cargo of salt herring. She was a vessel of the new type, able and seaworthy, but was doubtless overloaded, and, being caught in a heavy winter gale soon after sailing from the northwest coast of Newfoundland, she was probably sunk so deeply by an accumulation of ice on her hull and rigging, added to the weight of her cargo, that she no longer had sufficient buoyancy to ride out the storm, and was overwhelmed by the waves that fell with resistless fury upon her.

The practice of loading these sharp schooners with salt herring so deeply that they are almost deck to the water, and practically without any free board amidships, is highly dangerous, especially as the homeward passage must be made in late fall and winter, when gales are fierce and frequent and the cold often extreme.

The "Iolanthe" was built in 1883. She was one of the shallow type of fishing vessels in vogue at that time, but now generally recognized as more or less unsafe. She had a crew of 14 men. The "Alva" was a comparatively modern vessel,

* This list does not include the following: 2 men drowned in docks; 2 suffocated on board their vessels in harbor; 4 who died in harbor, 3 of them in hospital and 1 on shipboard; also 1 who died at sea. While these men were employed in fishing at the time they met their deaths, it does not appear that they lost their lives because of any special dangers of the sea or fisheries. The widows and children enumerated included 5 of the former and 10 of the latter, resident in foreign countries.

built in 1892. She was engaged in the winter haddock fishery, and carried a crew of 17 men.

The aggregate losses in the food-fish fisheries of the State were 14 vessels, of 787 net tons, valued at \$90,600. Of these, 3 vessels went down at sea with all hands, as already mentioned, 8 were stranded, 1 was sunk by collision, 1 schooner of only 9.63 tons sprung a leak and sunk a short distance outside Gloucester harbor, and 1 sloop of 11.18 tons was burned in harbor. The men lost in consequence of the perils of the fisheries numbered 69; they left 25 widows and 52 fatherless children. Of the men lost, 39 went down with their vessels, 16 were drowned by the capsizing of their dories, 5 went astray and perished, 5 were drowned by being washed overboard or by falling into the sea, and 1 was run down by a vessel and sunk.

Several escapes from death, by men who were exposed to the perils of starvation or drowning while astray in dories, — 2 of them for three days, — only emphasize the dangers of the deep-sea fisheries.

The fisheries that will be considered here have been generally successful, although less so, perhaps, in some branches than in former years, so far at least as the aggregate catch is concerned. At the same time there has been an active demand for products, and prices have generally ruled high, particularly in the fall, so that the earnings have been satisfactory.

The year is remarkable for record catches and high-line stocks in several branches of the fisheries. These have been due in several instances to improvements in vessels, whereby they are not only better adapted to fishery, but are likewise more certain to reach market with catches of fresh fish in good condition.

The mackerel fishery has been less successful than last year, so far as the aggregate catch is concerned. The season opened favorably, and all reports indicated a greater abundance of mackerel than usual on the southern fishing grounds, between Cape Hatteras and Long Island. The fish were mostly of large size, and schools were often taken containing 100 barrels or more. Extraordinary catches were made in April and May by seiners, and the drift-net vessels did well. During the

spring months the weather was generally mild for the season, and favorable to fishery. Record fares of fresh mackerel were landed at New York and other ports. Those ranging from 70 to 150 barrels were not uncommon. On April 29, the auxiliary schooner "Constellation" was reported at New York with 700 barrels of fresh mackerel, this being the fourth fare of the season for this vessel, and also the record catch to that time. She was reported to have been only twenty-four hours or so out from New York when she arrived with this fare. On the same date two other schooners were reported at New York with 200 and 300 barrels of mackerel respectively.

These catches were, however, eclipsed a few days later, for on May 3 the steamer "Alice M. Jacobs" was reported to have landed 800 barrels of fresh mackerel at Newport, R. I. This remains the record fare of fresh mackerel, and, what is still more remarkable, the claim is made that the entire catch was taken in one haul of the seine.

Had ordinary summer weather prevailed during June, July and August, there is reason for assuming that the season's mackerel catch would have been much larger than it was. Contrary to usual experience, the weather throughout the summer was most unfavorable to mackerel fishing, which can be prosecuted successfully only when moderate winds and smooth seas prevail. Instead of these there was an unusual prevalence of strong easterly winds* and rough seas, also heavy rains, while there was a notable absence of mild southwest winds, so characteristic of summer on the mackerel grounds.

It is true, occasional good catches were made, for the weather was not universally bad, and the fishermen were alert to improve every opportunity; but good chances to fish were somewhat exceptional, and the catches made only indicated what might have been accomplished under normal conditions.

It was also additionally troublesome to "keep run" of the fish, for they did not rise to the surface in high winds and rough seas as they might have done in finer weather, hence they could not be so easily observed. Then, too, it is not cus-

* Easterly winds, even if moderate, are generally unfavorable to mackerel fishing. As a rule, the south-west winds were of brief duration, and usually developed a fierce rain storm in a few hours, when the wind again went to the east or north-east.

tomary to keep a lookout at the mast head except when fishing can be prosecuted.

As the summer advanced it was evident the schools of mackerel had scattered, or that a majority of them had migrated to other grounds. This movement was caused by the presence of enormous numbers of dog-fish, or by some other influence unknown to the fishermen. Whatever the cause, it was discovered after a while that the bulk of the fish had left the grounds until then most commonly resorted to, that the fishermen had "lost run" of them, and that it was necessary to search elsewhere for the elusive mackerel. The swift vessels, some of them driven by motive power as well as by sail, cruised in many directions; all waters where mackerel were liable to occur were visited; lookouts watched night and day with untiring vigilance for schools of fish, but good catches were rare, and the season ended without the reappearance of the masses of large mackerel that were found on the southern grounds in spring, except so far as they were occasionally met with in early summer on Georges Bank or other localities north of Cape Cod, or for a few days in September in the Gulf of Maine.

Among the later fares of note the following may be mentioned: May 26 the schooner "Corsair" arrived at Boston with 550 barrels of mackerel, 250 of them, or about 30,000 fish, being fresh.

On June 26 the schooner "Edna Wallace Hopper" was reported in the press as landing nearly 50,000 fresh mackerel at Boston. She also had 200 barrels of salt mackerel, which were landed at Gloucester. The total was approximately 700 barrels. At the time it was roughly estimated she would stock more than \$6,000 on this fare, which was caught in two days.

The schooner "Speculator," of Gloucester, was reported as arriving at that port July 8 with 400 barrels of mackerel, 250 barrels of these being salted and the balance fresh.

On July 16 the steamer "Alice M. Jacobs" was credited with landing 45,000 fresh mackerel and 4 swordfish, and it was claimed she would stock \$4,300 on this fare.

Again, on July 29, the Boston "Globe" stated she landed

at T wharf the previous day "30,000 fresh mackerel, which sold to the dealers for 10 cents each, from which she netted \$3,000. She also had 70 barrels of salted mackerel, . . . for which she will probably receive \$10 per barrel."

At the same time, according to the "Globe," the schooner "Nellie Dixon" landed 14,000 fresh mackerel, the "Geneva Mertis" 14,000 fresh mackerel, and the "Grayling" 10,000 fresh mackerel.

The Boston "Post" of July 30, 1902, in its report of arrivals of mackerel schooners, mentioned the following: the "Constellation," with 25,000 fresh and 125 barrels salt mackerel; "Corsair," 17,000 fresh; "Mary L. Harty," 16,000 fresh and 50 barrels salt, and "S. F. Maker," with 15,000 fresh and 60 barrels salt fish. The schooner "Natalie B. Nickerson," of Boothbay, also had a fare of 30,000 fresh and 80 barrels salt mackerel. The last-mentioned vessel, as well as the first on this list, are auxiliary schooners.

The "Alice M. Jacobs" was credited with bringing a remarkable fare to the Boston market on September 23. "With the mackerel season about at an end," said the Boston "Globe," "the vessel seined in one day 800 barrels of large mackerel, 176 barrels of which were salted and the remainder brought into market fresh. . . . Capt. Jacobs received 12 cents each for his fish, and the stock for the trip amounted to nearly \$7,000."

Two or three days later the schooner "Nellie Dixon" brought to the same market a fare roughly estimated at 500 barrels of mackerel, 200 barrels being fresh and the remainder salt. Higher prices were obtained than the "Jacobs" received, and she was reported to have stocked about as much as the latter.

Following are some of the most notable of the season's catches and stocks:—

The steamer "Alice M. Jacobs,"* of Gloucester, according to Capt. Solomon Jacobs, her master and owner, earned a gross stock in the mackerel fishery of \$41,870, the record

* This vessel was new this year, and was not completed in time for her to arrive on the mackerel grounds until late in April, after some of the most profitable fishing of the season was over. In view of this her record for about six months' work is remarkable.

stock in this industry; her crew shared \$862 each, except the five men who were on wages.* Eighteen men were sharesmen.

It is pertinent to state in this connection that on May 26 this vessel pulled the coal-laden four-masted schooner "Frank A. Palmer" off the shoals outside of Nantucket and brought her to port. Again, on September 14, she towed the disabled steamer "Cape Cod" to Provincetown, and subsequently carried her passengers to Boston. In December, at Bay of Islands, Newfoundland, she likewise saved vessels from destruction and towed them to safety; several thousand dollars earned in this way are additional to her mackerel stock.

The auxiliary schooner "Constellation" is credited with a gross stock of \$31,000 for the season; her crew shared \$611.70 each.

The auxiliary schooner "Saladin" landed 800 barrels salt and 1,500 barrels fresh mackerel; gross stock, \$22,500; net stock, \$19,000.

The schooner "Bertha and Pearl," of Gloucester, is reported to have stocked \$21,400, her crew sharing \$506 each.

The schooner "Nettie Franklin," of Chatham, is credited with a net stock of \$15,000.

The schooner "Ralph L. Hall" is credited with a stock of \$18,000.

The schooner "Edna Wallace Hopper" is reported to have stocked \$25,000 in the mackerel fishery and \$15,000 in the herring trade, making a total for the year from the date she was launched of \$40,000.

The aggregate mackerel catch of New England, as reported to the Boston Fish Bureau, was 42,228 barrels of salt fish and 68,781 barrels landed fresh. The bulk of this catch was taken by Massachusetts vessels. This makes a total of 111,009 barrels, which is 23,049 barrels less than the aggregate catch given by the same authority last year, when 68,479 barrels of salt fish and 65,579 barrels of the fresh product were landed.

The growing tendency in ocean fisheries to market the catch fresh was never more strongly emphasized than in the mackerel

* The "Cape Ann News" of Nov. 20, 1902, says: "Had Captain Jacobs left with the fleet a month sooner, he doubtless would have added \$10,000 more to his large stock." There is probably good reason for this assumption.

industry during the present year, when nearly 62 per cent. of the New England catch was thus sold. But this year, as last, it is probable much larger quantities of mackerel were sold fresh than were reported, and it may perhaps be conservative to estimate the total at about 80,000 barrels. Last year, when the sales of fresh mackerel exceeded by a small fraction 49 per cent. of the catch, as reported to the Boston Fish Bureau, a record was made, but the result this year indicates a larger proportional demand for fresh fish. While, therefore, salt mackerel may always be required to some extent, it is probable that the demand for the fresh product will be more pronounced in coming years, especially if the catch is limited. Should there be a larger catch of mackerel, it is reasonable to assume that a greater percentage will be disposed of in a salted condition than when scarcity prevails. At the same time there is little probability that salt mackerel will be required in the future in anything like the proportional quantity that it has been in the past. The present outlook indicates the wisdom of planning to meet the demands of the fresh-fish trade in this as in other branches of the food-fish fisheries, for it is evident that in this will be found the readiest means of securing quick returns and large profits.

A remarkable feature of this year's mackerel industry was the success attending the hook and line fishery in southern Massachusetts at the close of the season. Mr. F. F. Dimick, secretary of the Boston Fish Bureau, refers to it as follows in a letter addressed to this commission: "Hook and line fishing for mackerel in Vineyard Sound was unusually good this fall. The mackerel were of small size, but prices ruled high, and a large number of boats found profitable employment."

An occurrence of this kind in the region referred to is sufficiently rare to make it noteworthy, aside from the satisfaction that may justly be felt with the success attained.

The addition to the fleet of the steamer "Alicé M. Jacobs" and three auxiliary schooners, fitted with screws and naphtha engines, may be classed among the most notable events of the mackerel season of 1902. The schooners were the "Constellation," "Veda McKown" and "Saladin." They were fitted to carry a full equipment of sail, and the auxiliary propelling



Fig 1. Auxiliary Schooner "Constellation" under Sail and Power.
Photographed by H. W. Spooner.

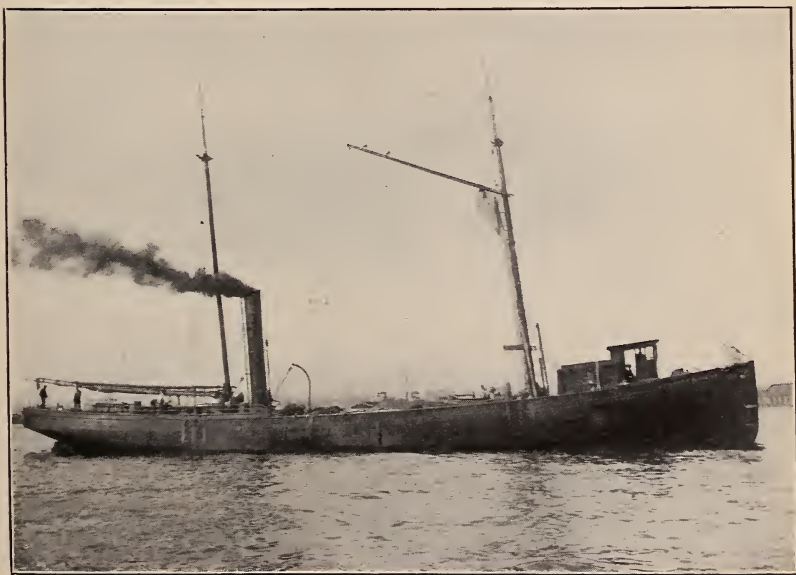


Fig 2. Mackerel Fishing Steamer "Alice M. Jacobs."

power is used chiefly in calm weather or when bound to market with a fare of fish. Their engines are about 85 horse-power, and are intended to give them a speed of seven to eight knots or upwards. In a fresh, leading breeze the speed is often high, with sails set and engines moving, while the propeller helps materially when pushing for market with a scant wind.

Some difficulties have been met with in getting the naphtha engines to stand the severe strains they must unavoidably be subjected to on large sea-going fishing vessels, and some delay has been experienced as a result of breaks and leaks, and arranging certain adjustments from time to time. Improvements are reported in the naphtha engines put on the new schooners this year, and much of the trouble experienced on those previously built has been remedied. Hon. William H. Jordan, collector of customs at Gloucester, says: "There seems to be very little difficulty with the engines." This is decidedly encouraging, and, since there appears to be a difference of opinion concerning the advantages of introducing power-driven vessels in the deep-sea fisheries from this State, we are glad to quote the following from Mr. Jordan, especially as he writes from the stand-point of long and valuable experience as an owner and manager of fishing vessels: —

A fishing schooner with a gasoline engine can do practically all the work that a steamer can do, at very much less expense; it requires one engineer only for the gasoline, while the steamer needs two engineers and two firemen; you can readily see the expense of coal and water for the steamer is far in excess of the cost of gasoline. I think that this type of vessel is a great advantage over the sailing vessel for almost any branch of off-shore fishing; certainly it would be of very great help in the halibut business in the summer time, and it is acknowledged that it is much superior in the seining business to the vessel with only sails.

One of these vessels costs about \$5,000 more than a sailing schooner of the same size. The dimensions of those built this year were approximately like those of the "Saladin," which were as follows: tonnage length (between perpendiculars), 108 feet; beam, 25 feet 3 inches; depth, 11 feet 2 inches; tonnage, gross, 138 tons; net, 89 tons.

The salt-cod fishery on the banks has not been so uniformly successful as might have been desired; nevertheless, many fine fares have been landed, some of which have established a new record. Some of the vessels have made large stocks for the season. Among the notable fares and earnings the following may be mentioned:—

The schooner "John J. Flaherty," of Gloucester, landed 650,000 pounds of salt cod as her season's catch, and stocked \$17,000, in round numbers. On her first trip she landed 370,000 pounds of fish, and on her arrival from her second trip, about November 20, her fare weighed off 280,000 pounds.*

The schooner "Talisman," of Gloucester, is credited with making a stock of \$24,290 in the Grand Bank cod fishery. She made three trips, and the high-line man of her crew shared \$719 for the season's work of about seven and a half months.

The schooner "Elector," of Gloucester, arrived home from the Grand Bank October 2, with 310,000 pounds of salt cod-fish.

The schooner "Hattie L. Trask," of Gloucester, landed 90,000 pounds of cod about April 20 as a result of a five weeks' trip to the banks.

The schooner "Maxine Elliot," of Gloucester, landed, as the result of two trips, 505,000 pounds of salt fish and stocked \$14,055. Her crew shared \$376 each.

The schooner "Lawrence A. Munroe" landed a total of 445,000 pounds of bank fish and stocked \$13,000.

The schooner "Aloha," of Gloucester, arrived at that port November 18 with a fare of 332,000 pounds of salt codfish and 5,000 pounds of salt halibut. She stocked \$11,508 on this second fare of the season. Her total season's catch was 536,322 pounds, and aggregate stock \$15,915.

The schooner "Maggie and May," of Gloucester, landed

* An interesting fact in connection with the first trip of the "J. J. Flaherty" is that the first half of her fare was caught with frozen squid as bait. The cod bit voraciously at these, which kept fresh much longer than new, fresh bait would have kept in ice. Thus time was saved that might have been expended in looking for fresh, unfrozen bait. But the most important thing is that this experience shows how squid caught in home waters may be kept frozen over winter and used advantageously by the bankers the next spring, thus, to that extent, obviating reliance on getting bait in foreign ports.

582,000 pounds of bank fish and stocked \$15,903. Her crew shared \$505 each for the season of six months.

Mention may also be made of the catch of the schooner "Harry L. Nickerson," of Boothbay, Me., which was only slightly less than that of the "J. J. Flaherty." She is credited with landing 645,000 pounds of salt codfish for the season and stocking \$17,000, her crew sharing \$570 each. Her last fare of 335,000 pounds of fish and a net stock of \$10,556, with an average share to each man of \$402.48, established a record for one trip in this fishery.

Some excellent fares were secured on Georges Bank, where the summer fishing has been exceptionally good. On September 2 the schooner "Canopus" * arrived, with a fare of 75,000 pounds of salt fish, from a three weeks' trip to Georges, and it was stated that in five trips she had landed over 300,000 pounds of cod, which it was thought exceeded all previous records in this fishery.

The schooner "Penobscot" landed 45,000 pounds of cod at the same time, and was credited with having had an aggregate of 375,000 pounds in six trips.

The principal change in the distant bank fishery for cod is in the tendency to adopt dory handline fishing instead of fishing with trawl lines. The former method has proved profitable in recent years, and has the advantage of not being dependent on supplies of bait obtained at foreign ports. The rather extensive adoption of this method of fishing from Gloucester is a recent notable innovation and seems a profitable one.

The schooner "A. E. Whyland" sailed from Gloucester May 2, 1902, on a salt halibut trip to the Arctic Ocean, and returned to the home port on September 14. She landed 171,000 pounds of fletched halibut, 83 barrels of halibut fins, 20 barrels of halibut roes, and stocked \$12,173.44. She had a crew of 18 men, each of whom shared \$307.23.

Large catches of fresh halibut are not so common on the Atlantic fishing grounds as they once were, and those obtained are generally secured north of the Grand Bank, off the eastern coast of Newfoundland or farther north, off Labrador.

* All the vessels mentioned here as fishing on Georges Bank belong at Gloucester.

On May 19 the schooner "Admiral Dewey" arrived at Gloucester, and was reported as having 50,000 pounds of fresh halibut, caught off the east coast of Newfoundland.

The schooner "Oregon" arrived at Gloucester August 12 with a fare of fresh halibut reported as 75,000 pounds. These fish were caught off the Labrador coast, the most northerly fishing station, estimated to be about 400 miles south of Greenland. This is a long distance from which to bring fresh halibut to market on a sailing vessel. Two weeks later the schooner "Yakima" landed a fare of fresh halibut at Boston, estimated at 80,000 pounds. These fish were reported to have been caught in north latitude 55 degrees, off the Labrador coast.

The schooner "Theodore Roosevelt," of Gloucester, landed a fare of fresh halibut about the middle of October, which yielded a stock of \$2,475.

The schooner "Massachusetts," of Gloucester, arrived home with a fare of fresh halibut a few days prior to the middle of November, her stock reaching a total of \$3,250. Two other good fares were landed only a few days later. The schooner "Madonna" stocked from one of these fares \$3,100. She was absent only three weeks, we are informed.

The interest of this State in the halibut fishery is divided between the Atlantic and the Pacific, and at present it looks as if the fresh halibut fishery on the Atlantic banks might be superseded in the not distant future; it certainly is confronted now with the keenest competition.

The fresh halibut fishery carried on from this State in the Pacific, off the northwest coast of America, in many respects is one of the most remarkable fisheries in the world. The introduction of new and improved types of vessels, and the vigor and success which have characterized its prosecution, are creditable to Yankee intelligence and enterprise, and emphasize the continuation of the adventurous and forceful spirit which has ever made Massachusetts fishermen noteworthy.

The Pacific halibut fishery was begun, on a commercial basis, in 1888. In the autumn of 1887 some adventurous fishermen sailed in three schooners from the ports of this State to engage in it. The efforts were well meant but unsuccessful. The high transportation charges between Puget Sound ports and

the Atlantic coast, the scarcity and high price of ice on the west coast, unfamiliarity with the fishing grounds, and the additional fact that sailing schooners were unsuited to the industry, combined to defeat the first attempts to establish this fishery on a safe paying basis. It is true quantities of halibut were caught in 1888-89, but the net financial result was unsatisfactory. For the time being there seemed little prospect of the survival of the halibut fishery; indeed, it was temporarily discontinued, to a greater or less extent.

Discussing the outlook for the industry on the basis of conditions in 1889, the writer ventured the following statement: "To insure the establishment of a successful halibut fishery on a permanent basis it . . . seems necessary . . . that steamers should be employed for fishing, and that transportation agencies should realize the importance of making favorable rates in order to build up the business. The enterprise should also have the advantage of starting with ample capital, backed by a knowledge of the business." *

The adoption of these suggestions in their entirety has brought results far beyond what the boldest dared to dream of when the words above quoted were written. This industry is an interesting subject and might well claim large attention, but the limits of this report will not admit of more than a brief allusion to it. It must suffice to mention only a few salient facts, and to say that nowhere on earth, within comparatively easy reach of a market, have there been found in recent years such marvellously prolific halibut grounds as those in the Pacific, frequented by the fishing steamers from this State. The record catches of other years on Atlantic banks, remarkable as they have been considered, dwindle almost into insignificance in comparison with the heretofore unparalleled cargoes of fresh halibut obtained in the Pacific.

As an instance, in the season of 1901 the steel screw steamer "New England," of Boston, caught a fare of 210,000 pounds of fresh halibut, and is reputed to have arrived at her port of discharge within a week from the day she steamed to sea.

The accompanying illustration (Fig. 1, Plate VII.) shows her

* Report on the Fisheries of the Pacific Coast of the United States, by J. W. Collins, page 265.

with this remarkable catch on board, which was sufficient to sink a steamer 140 feet long nearly to her deck line. It is certainly phenomenal that a single crew should catch and care for more than one hundred tons of fresh halibut in only three or four days.

While this fare may still be the record, for it reached the limit of carrying capacity, many others have been made that were nearly as large. On Nov. 6, 1902, the new steamer "Kingfisher" arrived at Vancouver with a fare of 185,000 pounds of halibut, which on the following day were rushing across the continent on a fast train.

The prosecution of this Pacific halibut fishery on the steamers referred to compels the most strenuous effort humanity is capable of. During weather when fishing can be carried on comfort and rest are disregarded to a degree not probably equalled in any other industry. So great is the physical strain that only the strongest men can endure it. It is true there may be rest and relaxation in heavy gales or storms, when a small dory could not live in the boiling turmoil of driving seas, for at such times shelter is usually sought in nearby harbors; but it must be understood that, while the fierce, wild weather of winter may sometimes prevent fishing for weeks together, no opportunity is left unimproved, and the conditions are severe when the steamers are not on the fishing ground and the dories setting and hauling their lines. And in this battle with the elements little heed is taken of thick weather; blinding fog or driving snow may shut within the narrowest limits the frail boats and their crews, but the work goes on.

As soon as a cargo of fish is landed at Vancouver, the steamer immediately proceeds to the point where she is to coal and take on other outfits. Fuel and stores are got on board with all practicable despatch. In the meantime, while coaling is in progress, the fishermen overhaul their gear and bait up their trawl lines, so that they will be ready for use when the fishing ground is reached. This work, however, may be continued until the steamer is well on her way to the point of destination.

If the weather is suitable the lines are set as soon as the halibut ground is reached. Fishing is carried on unremittingly

all through the day, and generally the catch is large enough to keep all hands busy through the night, dressing and icing the fish. Ordinarily the fishermen begin to bait their gear about two o'clock in the morning, if the catch is nearly enough cared for, so that other members of the crew can finish that work.

There is no time for sleep, and no thought of it, unless the first day's catch is big enough to justify starting for market or the weather is too rough to fish; but as soon as possible after dawn the fishing is resumed, and the efforts of the first day and night are continued for the next twenty-four hours, and probably for the third day and night as well, before any time can be taken for sleep or rest.

No sooner, however, is the last halibut on board, and the last dory stowed on deck, than the vessel is off on her course for the port where the fare is to be landed, and all steam is crowded on consistent with safety. If the last day's catch is large she may be nearly a hundred miles on her way before the fishermen cease their labors in dressing and icing the fish, and it is possible for them to get the sleep and rest that are so much needed, after days and nights of continuous and exacting effort and peril.

The steamers do not anchor on the fishing ground, but drop the dories and cruise around among them while the lines are being hauled, in the same manner as is customary on schooners when setting under sail. Thus the loaded dories are relieved of their cargoes, and the labor of rowing is dispensed with as much as possible. In thick weather the whistle on the steamer is blown at frequent intervals, and the fishermen are kept informed of the vessel's whereabouts.

Twelve dories are carried on steamers like the "New England" and "Kingfisher;" the crew aggregates 37 men on the latter. The crew is composed of the captain, mate, pilot, 2 engineers, 4 firemen, 4 deck hands and 24 fishermen.

The fishermen go on shares, but all others are on monthly pay. Dorymates "throw together," as it is called, and the pay of each boat's crew is governed by the catch, an account of which is kept by the officers. The spirit of competition is a strong factor in the work, and no risk or labor is shirked in the effort to win the high-line share. The fishermen make

good pay, not unfrequently sharing more than the captain receives as wages, hence the best men are obtainable, and inefficiency or drunkenness is not tolerated.

The aim of those controlling this industry is to have the steamers make short trips, so that the fish may be in the best possible condition on arrival at port. This is necessary in order that the halibut may reach the Atlantic coast — Boston, for instance — in fine order. Therefore the time spent in fishing on the banks is not expected to exceed three days on any one trip, and sometimes fishing is carried on only one or two days before starting for market. Of course there may be exceptions to this, but the one dominant thought — the idea which ought to control in all branches of market fishery — is to get the fish to port and to the consumer while they are still new, fresh and savory. Thus, if a large catch is made on one day, and the next day is unfavorable for fishing, it is more profitable to land the fish taken, even if less than a full cargo, than to wait an uncertain time for the opportunity to catch more to complete the fare.

When port is reached no time is lost in landing the cargo, which is transferred from the steamer's hold to the refrigerating cars with the utmost despatch. All hands engage in this work, with the possible exception of the engineers and firemen, who may have imperative duties in their own departments to attend to, and there is no let up in the rush until the last halibut is on board the train, the ice house is cleaned out and the deck washed down, when the new trip begins. A night may be spent in port, and maybe more, if the weather is unusually bad, but no time is wasted, nor can it be if the supply of fish is to be relied on.

The steel screw steamer "Kingfisher," of Boston, to which allusion has been made (Fig. 2, Plate VII.) is one of the most important additions this year to the Massachusetts fishing fleet. She was designed for this fishery, and in form, material, construction and equipment may well be considered as the highest type of vessel yet produced in this country for employment in the deep-sea food-fish fisheries. In appearance she resembles a large, sea-going tug, and, as a matter of fact, she is fitted with towing bollards, so that she is always ready for towing,

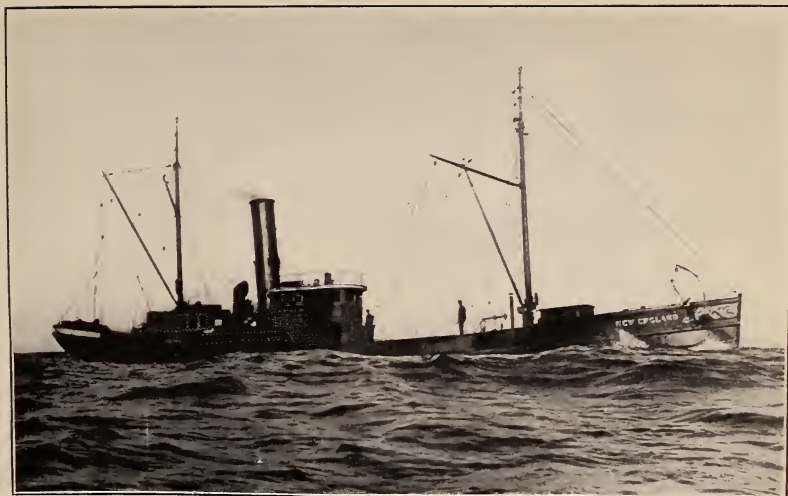


Fig. 1. Fishing Steamer "New England," with Fare of Halibut on Board



Fig. 2. Halibut Fishing Steamer "Kingfisher."

if a derelict should be met with at sea, or any other condition should make it desirable for her to tow other craft. Primarily, however, she is a fishing steamer, and everything else is subordinated to the idea of making her thoroughly fitted for the halibut fishery.

Her lines are easy and graceful, with moderate rise to floor, round stern, flush deck, pilot house high above the deck, and bow rising bold and high, so that it may be well above the water when she is deeply loaded. She has accommodations for 40 men. The cabin is under deck aft, and the forecastle is forward. The fish room is between the boiler room and fore-castle, and has a capacity for 200,000 to 215,000 pounds of fresh halibut, packed in ice. She is equipped with triple expansion engines; cylinders 14, 22 and 36 inches, with 24-inch stroke. She has a Scotch boiler 10 feet 6 inches long and 13 feet diameter, and can carry a steam pressure of 180 pounds to the square inch. Her maximum speed, under steam alone, is said to be in excess of 14 knots; her ordinary sea speed, 12 knots. She is schooner rigged, with pole masts, jib stay setting up to stem head, and carries two small boom and gaff sails and jib. Her dimensions are as follows: length, over all, about 140 feet; for tonnage, 130 feet; beam, 24 feet; depth of hold, 14 feet 6 inches; gross tonnage, 263 tons; net tonnage, 141 tons. She was built by the Risdén Iron Works at San Francisco, Cal., and launched in the summer of 1902. The illustration (Fig. 2, Plate VII.) shows her as she appeared on her trial trip near San Francisco.

The deep-sea market fishery, for cod, haddock, etc., has been successful, and many large stocks have been made. This result evidences the demand for fresh sea fish, and indicates the satisfactory prices which have generally prevailed. But, in making comparison of the stocks earned in the market fishery with those obtained in the mackerel or bank fisheries, consideration should be given to the fact that, whereas the season for mackerel or bank fishing for salt cod seldom exceeds seven months, the market fishery continues throughout the year. As a matter of fact, vessels engaged in the salt cod fishery or in the mackerel fishery, during their seasons, usually pursue some other fishery in winter; not uncommonly they participate in

the market fishery, but more frequently, perhaps, in the frozen herring trade. Inasmuch, however, as the earnings of such vessels for an entire year are not commonly published, and are not easily obtainable in other ways, they cannot be readily given. Besides, in the case of vessels employed in the herring trade it is difficult to arrive at their earnings as compared with those in other branches of fishery, for the reason that the industry is not pursued on the same basis.

The schooner "Francis Whalen," of Boston, is reported to have stocked \$22,000 in six months in the market fishery, which is most remarkable. The earnings of this vessel in the time mentioned furnish a fair basis of comparison with the stocks of other schooners engaged in the mackerel and salt cod fisheries.

The schooner "Clara M. Littlefield," of Rockport, in ten and a half months has stocked \$21,830. Her crew has shared \$1,000 each, in round numbers.

The schooner "Benjamin F. Phillips," of Boston, made a gross stock between June 12 and November 21 — five months and nine days — of \$19,067.02. Her crew shared \$450 each.

The schooner "Navahoe" stocked about \$30,000 in eleven and one-half months. Her crew shared \$800 each in round numbers.

The schooner "Alice M. Guthrie," of Boston, has been one of the most successful market vessels. In a year from the time she was launched in August, 1901, she is credited with landing about 1,350,000 pounds of fresh fish, on which her stock amounted to \$34,000, her crew sharing \$950 each. During the year she made forty-five trips, mostly to the south channel fishing grounds, but the winter trips were generally to Georges Bank.

Probably the most interesting innovation in the market fishery of the State during this year was the building of the schooner "Helen B. Thomas," of Boston, from designs by Mr. Thomas B. McManus (Fig. 2). This is a wooden sailing vessel of a distinctly new type, both as to shape of hull and rig, the latter having been called "the McManus rig for schooners." The notable points of the vessel are as follows: she has long overhangs forward and aft, similar to those on the well-known

small yachts called knockabouts, and because of this the schooner has been called the “knockabout fisherman type.” Her ends are fine and well formed, the floor sharp, bow flaring, keel short and deep, and stern-post raking rather strongly. She has a fine sheer and flush deck, with the ordinary arrangement of hatches, cabin trunk and forecastle. Her masts are unusually close together and rather tall, giving a large mainsail and maingaff topsail, while the foresail, foregaff topsail and main staysail are comparatively small. The striking feature of her rig is the absence of a bowsprit, notwithstanding she carries a double head-rig, so called. Nothing extends forward

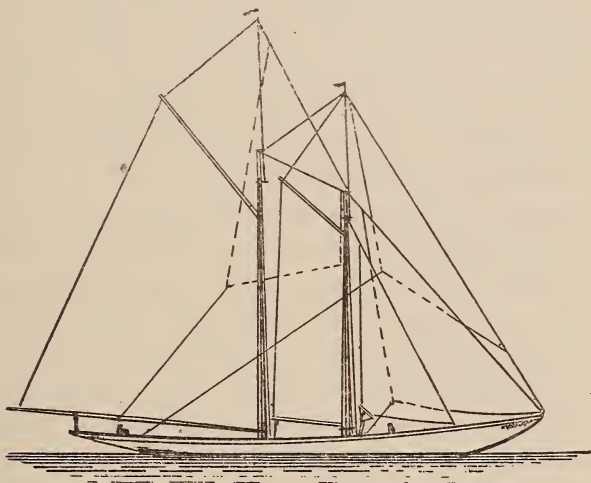


FIG. 2. — Sail plan of schooner “Helen B. Thomas.”

beyond the stem. The forestay, upon which the forestaysail is set, is nearly half way between the foremast and the stem, while the jib stay and the foretopmast stay come down to the stem head. A large jib and ordinary jib topsail are carried, but the forestaysail is small.

The advantage of this rig is found in the fact that (1) there is no necessity to incur danger when shortening sail by men having to go out on a bowsprit; (2) there is no wear and tear of sails on the head rigging or bowsprit in rough weather; (3) there is no trouble with the head sails washing loose, as they sometimes do when furled to a bowsprit; and (4) there is no bowsprit in the way when coming into dock.

Those who have sailed on the "Thomas" give a gratifying account of her fitness for the trade. Aside from being swift and quick in stays, etc., she is reputed to be very seaworthy and notably dry forward, while her overhangs necessarily increase her buoyancy as she settles in the water when fish are taken on board. Following are her principal dimensions: length, over all, 106 feet; on water line, 67 feet; beam, 21 feet; depth of hold, 9 feet 8 inches; tonnage, 75 tons; mainmast (full length), 73 feet; foremast, 62 feet; mainboom, 59 feet; maingaff, 34 feet; foreboom and gaff, each 20 feet.

We are informed that six schooners, substantially of the same type as that described, have been built recently for the red snapper fishery from Galveston, Tex. This is an interesting fact, because it shows the influence of Massachusetts upon the fisheries of other States. These red snapper vessels differ from the "Thomas" chiefly or wholly in having a little less overhang forward and a short bowsprit.

The herring industry is improving, and, with increasing attention to cure, the demand for products is advancing. There is much to be desired yet, but, with the quoted prices for the best quality of pickled herring sold by our vessels nearly or quite double what it was last year, there is occasion for reasonable gratification with the change. The outlook for trade in herring was never better than at the close of this year, and many large cargoes of fat fish from the northwest coast of Newfoundland have arrived unusually early this fall. The fleet that has engaged in this trade at the close of the year is larger than common, and includes the finest fishing vessels from the State, one being the steamer "Alice M. Jacobs," and several of them being auxiliary schooners.

The progress made in the herring trade has been remarkable. It has been stated that Gloucester alone has received 55,502 barrels of fish of this species, most of which came from the northwest coast of Newfoundland in a salted condition. The herring are chiefly salted in bulk on board the vessels, only a comparatively small amount being split and salted in barrels (or pickled cured) as soon as caught. The bulked herring, which can be sold cheaper than pickle-cured fish, are utilized almost wholly for smoking, and the expansion of the trade in

fat smoked herring, during the past three years, has been an object lesson as to what may be accomplished when a product of fishery meets the requirements of the public.

So far as this smoked herring trade goes there is occasion for much satisfaction with the progress made, but the success thus attained should be an incentive to give more attention to the development of the pickle-cured herring trade, which offers a much larger field for exploitation, although the competition may be keener and more difficulties may be encountered in getting control of the markets. But the ultimate result is so important to the general success of our fisheries that no effort should be spared to work up a demand for the highest grade of American pickle-cured herring. This subject has, however, been so fully discussed in recent reports of this commission that its amplification here seems unnecessary. It is sufficient to say that never before in the history of the fishery industries of this State has it been more important to exercise the highest intelligence in creating a reputation for fishery products, and thereby enlarging the demand for them. In no other way can competition be successfully met, and the very existence of the State fisheries may depend upon it if it transpires that, as a result of reciprocity treaties, foreign-caught fish are admitted free to our markets. In view of this possibility, it will be wiser and safer to be well informed regarding the best methods and best vessels used elsewhere, and nothing should be left undone that will help our fisheries to successfully meet the conditions that now confront them, and which may become still more difficult to contend with in the future.

In the reports of the past two years particular stress has been laid upon the importance of exercising the utmost care in the preservation of fish products for food, and suggestions and recommendations as to methods, etc., have been made. The matter is of so much moment, however, that, until perfection has been attained in this particular, improvement in this direction cannot be too frequently or too earnestly urged. This is sharply emphasized by the following declaration of Mr. Eugene G. Blackford, one of the largest fish dealers in New York, ex-president of the New York Fish Commission, and one of the most observant men in the fish trade of the country : —

As an example of increased returns to the shippers from careful handling, I call attention to the fact that certain shipments of shad going to the New York market from North Carolina bring from 25 to 40 per cent. more than other shad from the same locality. . . . What I wish to impress upon the shippers and fishermen is that for every dollar invested in labor and ice in packing the fish they will receive ten dollars in return.

The importance of fish as an article of food, if proper care is exercised in preservation, has been dwelt upon by scientific men, but cannot be too frequently brought to public notice. Prof. H. A. Surface, of the Pennsylvania State College, has made the following statements regarding the value of fish as a food:—

They are beyond doubt the best flesh food that mankind can eat, and as a consequence serve as food for all nations. Statistics show that those nations, like the Scotch and South Sea Islanders, who eat fish as their chief flesh food and avoid beef, are most exempt from tuberculosis and other diseases and parasites that are conveyed to man by infested beef. *

Some public interest has been felt because of the determination by the United States Fish Commission that the tile fish (*Lopholatilus chamaeleonticeps*) occurs in great abundance in the region south of Gay Head and Montauk, where it has been taken on or near the edge of the continental plateau, in depths generally exceeding sixty fathoms. The catches made by the United States Fish Commission schooner "Grampus," with a limited amount of trawl line, indicate that this fish bites freely, and that large fares might be quickly obtained by using the quantity of gear commonly operated by fishing schooners.

The tile fish was first known to fishermen and to science in 1879. Three years later it was apparently exterminated by some natural cause in the region where it had been discovered, and millions of them were seen floating at the surface of the ocean, dead or dying. For some years thereafter it was not seen, although several expeditions were sent out to look for it. A few years ago, however, it reappeared again on the old

*.Circular issued by Prof. H. A. Surface.

grounds, in limited numbers, but recently it has been very abundant.

The tile fish is comparable with the cod for size, ranging in weight from five to fifty pounds. As a food product it compares more nearly with the cod, perhaps, than with any other species. The writer has eaten it fresh, but failed to find it so desirable in flavor as many species of fish commonly found in our markets, although others like it. Opinion is not unanimous regarding its food qualities. Tile fish were smoked when they were first taken in 1879, but those expert in judging of fish were divided in opinion then, some thinking they rivalled smoked halibut, while others deemed them inferior. They doubtless would be good cured as the finnan haddies are. It cannot be dry cured, like cod, but, of course, can be pickle cured, like herring or mackerel. It is probable, however, that this species will not be in large demand immediately, for the reason that the market is generally well supplied, if not over supplied, with many varieties of fish of the choicest kinds, which can be bought at reasonable prices. Nevertheless, if it is found that the tile fish can be caught in such large numbers that it can be sold, either fresh or cured, at a low price, there is a strong probability that a market may be found for it. If this does not happen immediately it may occur later, when increasing populations require a more general utilization of our fishery resources, and especially of those species whose abundance is sufficient to bring them easily within the reach of persons of limited means and still leave a margin of profit to the producer. Recent years have witnessed many remarkable changes in the extensive utilization as food of certain species of fish heretofore little valued or not used at all, and for this reason it is difficult at this time to say how large a place the tile fish may occupy in the fish trade of the future, if it continues abundant.

The Russians have a method of treating pickle-cured fish in warm weather that may deserve the consideration of our fish curers, especially those engaged in curing cod that are, for a greater or less time, salted in large casks or butts that are filled with brine after being first filled with fish.

The curers of Astrakhan salt quantities of fish in large casks

which are filled with pickle; but to insure an equable temperature of the brine, and a consequent better cure of the fish, the casks are buried nearly to their tops in the earth, on the ground floor of the large packing houses.

As is well known, the extreme heat of summer is liable to unfavorably affect pickle-cured cod, especially after being packed in boxes and shipped as dry or boneless fish. The fish, thus exposed to a warm climate, sometimes becomes covered to a greater or less degree with a red, vegetable, mold-like growth (*Clathrocystis roseopersicina*), and the appearance of this plant destroys the market value of the product. Sometimes this redness of salt cod appears while they are in the butts or packed in piles or kenches in the curing houses. If, therefore, this can be prevented by the adoption of any such simple method as that employed by the Russians, the fish trade will be benefited. In any event the matter is of sufficient importance to warrant experiments by fish curers to test the question.

In the ordinary process of trying out cod oil in the old-fashioned way, by putting the fish livers in barrels or larger casks to rot and try out by atmospheric influence, large quantities of refuse, known to the trade as "blubber," accumulates. This has been considered worthless by those interested in our fisheries and usually has been dumped overboard. In Europe it is profitably used, and quantities of a good article of brown oil and a specially valuable fertilizer are obtained from this product. This is not only possible, by the improved processes of these days, but the writer has personally investigated the matter in England, and believes it perfectly practicable to utilize this waste product so that additional profit may accrue to the cod fishery as a result.

The importance to the fisheries of the utilization of waste products—this gathering of the gleanings—is far beyond what may be deemed probable by those unfamiliar with the history of these industries. The fish-glue industry is an instance in point, with a trade extending throughout the world, and a financial result not to be despised.

In previous reports we have alluded to the effort made by this commission to promote trade in cod roe. When this

effort was inaugurated cod roe was not worth enough to warrant saving it, the net price not exceeding \$3 per barrel to the dealer. This year Massachusetts roe sold in France has netted the dealers here, so we are credibly informed, from \$10.50 to \$14.25 per barrel. To what proportions this trade may grow, if wisdom controls it, is not an easy matter to determine. The following statements regarding the Norwegian roe trade will, however, suggest what may be possible, although at the present time the outlook for next year is not promising for a good demand in France, because of the scarcity of sardines the present year, and the consequent supply of roe left over: —

In 1901, Bergen, Norway, exported 34,800½ barrels of cod roe. Of this amount, 25,497½ barrels went to France and 9,303 barrels to Spain. In addition to the above amount, Aalesund, Norway, is credited with having exported 3,000 barrels in round numbers, and it has been estimated by competent authority that the total exports of cod roe from Norway in the year above mentioned amounted to 45,000 or 50,000 barrels. This roe sold at prices varying from \$13 to \$18 per barrel, according to grade and season. If we place the average as low as \$14, the total value of the larger estimate of exported roe, which is probably conservative, would be \$700,000.

These figures indicate that the cod roe trade holds out inducements that should not be neglected, and likewise suggest the importance of utilizing everything that comes from the fisheries which will yield a profit through intelligent treatment.

INSPECTION OF FISH.

By an act approved Feb. 27, 1902 (chapter 138, Acts of 1902), the powers and duties heretofore devolving upon the inspector general of fish were imposed upon this commission. It transpires, however, that, since the passage last year of the law now embodied in section 6, chapter 56 of the Revised Laws, there is little occasion for inspecting fish, for inspection is in no sense obligatory, the statute providing for it only "if, at the time of purchase, the buyer so requires, such fish shall be inspected."

This provision is a practical abolition of the fish inspection laws of the State, if judgment can be formed on the result during the present year. Only three persons applied to the commission for appointments as inspectors of fish. These were George H. Perkins, Charles H. Pew and Joseph Rice, all of Gloucester.

Only one of these, Mr. Perkins, has inspected any fish since the appointments were made, and he inspected a total of 2,054 barrels, 62 half barrels, 18 quarter barrels and 34 ten-pound kits of mackerel. In no other instance, so far as we are informed, did a purchaser indicate a desire to have fish inspected. Mr. Rice states that, although he asked buyers if they wanted the mackerel inspected which they had bought, they always replied in the negative.

As has been intimated, no species of fish other than mackerel has been inspected in this State during the period since the present law (chapter 138, Acts of 1902) became operative. The mackerel inspected were classified, according to quality and package, as follows: 1,684 barrels, 54 half barrels, 14 quarter barrels and 34 ten-pound kits of No. 1; 370 barrels, 8 half barrels and 4 quarter barrels of No. 2.

The money received by this commission as fees for the fish inspected by George H. Perkins was \$20.98. In accordance with law, this will be paid to the Treasurer and Receiver-General of the Commonwealth on the first Monday of 1903.

It is probably too soon after the passage of the law mentioned (section 6, chapter 56) to discuss its effect with a full understanding of how it will work. It is evident, however, that middlemen and retail dealers, especially those purchasing fish to go outside the State, do not consider the State inspection brand of special value to them. Whether the future will bring any change in this regard remains to be seen, and it may now be inadvisable to speculate as to whether the consumer of fish will ever demand a better guarantee of their quality than that now given. It is certain the State cannot give this to fish sent beyond its boundaries, but it seems within the possibilities for Congress to control the quality of food products that are objects of interstate commerce. If this assumption is correct, and federal control should ever become an accomplished fact, so

that the inspectors' brand becomes a satisfactory guarantee of quality to the consumer, the advantage to all concerned, and especially to the fisheries interests, cannot be over-estimated. Nothing else can probably prove so advantageous in meeting foreign competition.

GAME.

Relation of Game to Public Welfare. — It is probable that the average person gives little thought to the effect of game upon the public welfare. Most people think of game only as something to be hunted and killed, to profit from by its sale (perhaps to derive the largest profit from its illegal sale), or as the principal attraction of a well-spread table. Many feel that they should have full liberty to hunt or kill whenever it suits their desire or convenience, little recking the result, and they resent restrictive regulations and generally consider it no crime to violate the game laws; in fact, rather glory in the act, if they escape detection and the penalty the courts may impose.

Those who take such narrow views regarding game are either pot hunters, whose vision is limited only by the amount of money they may obtain from hunting, without too scrupulous regard for the limitations of law, or persons desirous of the recreation and excitement that hunting generally gives, but who are either too indifferent to anything but the pleasure of the moment to heed anything else, so selfish that they think it smart to "get in" during close season when law-respecting citizens are barred, or else heedless of consequences to the public welfare, or the preservation of sufficient game to make the hunting of it an object of either sport or profit.

On the other hand, there are many persons, including the most distinguished in this country, who intelligently appreciate the relation of game to public welfare, and who have used their utmost exertions to secure the enactment and enforcement of protective laws. Those most prominent and indefatigable in this effort are of the class ordinarily termed sportsmen. While it may, perhaps, be claimed that many have been prompted chiefly by the desire to preserve sufficient game within the borders of the State to make hunting attractive for themselves, there is no question that others, and probably the

larger number, have taken the broadest view of the matter. In any event they have builded wisely, and many beside sportsmen have profited in consequence of their efforts.

It is true that the benefit derived from hunting as a healthful and attractive recreation is beyond estimate, and if nothing else is considered but the improved physical condition of thousands—resulting therefrom, and the fact that, because of the vigor thus gained, they are better fitted to endure severe mental strains than otherwise might be the case, the public is sufficiently benefited thereby to compensate for any effort put forth or any expenditure by the State in its attempt to preserve satisfactory conditions.

But, however beneficial hunting may be from the point of view already considered, this by no means includes all the advantages to be derived from the conservation of a game supply. For while no one will question the benefits to people of modest means to be able to hunt where game is reasonably abundant almost at their doors, and thus freely enjoy this exhilarating sport as well as those possessed of wealth and leisure, the fact remains that the farmer may profit still more than the sportsman because of the destruction of noxious insects by birds. Many farmers take a highly intelligent view of this matter. Not only do they favor the enforcement of the game laws generally, but they can indicate specifically how they are benefited by game birds, notably the quail, which is well known to be an active agent in destroying insects that are harmful to growing crops. Inasmuch as the game laws also include most stringent provisions for the protection of insectivorous birds of all kinds, it will be seen to what extent the farmer and the public generally are indebted to game for the preservation of species which do so much to make agriculture and horticulture possible within our borders.*

* To cite a single instance of how an intelligent interest in this matter is spreading throughout the rural districts the following is quoted from a letter from Mr. Myles Standish, of Rock, to deputy Otis Thayer: "When we took up this game business and put up our posters, some around here thought we were going to have everything our way. But to-day those men are buying posters and putting them up themselves. Now this is why: One man told me that the quail kept the bugs from his potato tops, and said he did not have to use Paris green this year. If the farmers would take more interest in game, we would not have so many in sects. I love to get these men and let them see what game means to farmers."

Nor is this all. As we have previously pointed out, the desire to hunt is so strongly implanted in many that it must be gratified, even at the sacrifice of time and money. If it can be indulged at or near home, within State limits, any money that otherwise might be spent in seeking game elsewhere is saved to our citizens, and the State is benefited to that extent. Then, too, residents from other States may be attracted here by the presence of game, as in fact they are, and, aside from the benefit derived from any disbursements made by them during temporary visits, larger results may sometimes follow in the building of summer or autumn homes and the inauguration of conditions of inestimable importance to local residents in particular and the State in general. The benefit thus derived by Massachusetts is too well known to require elaboration or verification. And in view of the possibilities of game in this State, as evidenced by the increase of both birds and animals during the past three years, there is reason to anticipate it may have a helpful influence in the future in bringing prosperity to some of our towns which now seem to have no equally good prospect for advancement, as is embodied in the attractions held forth by their supplies of fish and game.

Mr. F. W. Scott, fish and game warden of Montana, in writing of conditions in his State, and the influence exerted by game or fish, says: "Millions of eastern capital have been invested here whose owners were first attracted by the hunting and fishing, and nothing should be overlooked that will induce others to come and do likewise." *

Similar advantages have come to this State, and still more may come, if conditions obtain which enable the conservation and increase of nature's bounties to the degree that recent experience has shown to be perfectly feasible. If it is not practicable to have the larger species of game which occur in regions where vast areas still remain in almost undisturbed wildness, it is, nevertheless, not difficult to have here sufficient of smaller varieties of game to furnish ample sport for the hunter, and that of a high grade, while supplying delicacies for the table which, in the aggregate, amount to no small item in the food supply.

* "Forest and Stream," Aug. 9, 1902.

Need of Protective Legislation. — Section 2, chapter 92 of the Revised Laws, containing the provisions of the non-sale law on ruffed grouse or partridge and woodcock, expires by limitation next July, so far as the prohibition of sale of these species is concerned. Nothing relating to the protection of fish and game that is likely to be brought to the attention of the Legislature at its session in 1903 is of equal importance to the re-enactment of this non-sale law.*

The experience since its enactment in 1900 has shown conclusively that with such a law on the statute books, and reasonable provision for the enforcement of it, it is entirely feasible to secure an increase of game birds in this State. This applies with special force to the partridge, the king of New England game birds, the preservation of which is especially important because it has never been found practicable to breed or raise it in confinement; also because it is non-migratory; and the birds of this species reared in the covers of this State are, to all intents and purposes, Massachusetts birds, in which we may justly have a peculiar interest.

The woodcock, despite the fact that it is migratory, is believed to be increasing in some sections of the State, because of the protection afforded by the law referred to. The further prohibition of its sale will be in line with the effort to fully protect it in other States, and it is reasonable to hope that legislation for the better preservation of this valuable game species will be general throughout its range.

While the non-sale law regarding the partridge and woodcock did not limit the sale of quail in a similar manner, it is believed by many that the effect on the preservation of the quail was most beneficial. If this assumption is correct it is an additional reason why the law should be re-enacted.

It is not, however, the purpose of this chapter to point out specifically what should or may be done to improve our protective game laws, since that phase of the question is dealt with elsewhere. The object here is chiefly to consider the

* Deputy Charles N. Hunt of Quincy, who spent considerable time in Berkshire County during the open hunting season, says: "Sportsmen favor the anti-sale law. A leading sportsman in Lenox told me that if the law was taken off, in two years there would not be a feather to shoot at in Berkshire County."

importance of having adequate protective measures, and the non-sale law has been mentioned in some detail because it furnishes the best possible illustration of the matter. If so much benefit can result from one law in a brief time, and certain species of wild birds can be brought from almost the point of extermination to comparative abundance in most sections of the State, as is the case with the partridge, the public is supplied with an object lesson of the efficacy of wise game laws, well enforced, such as is not only rare but instructive. It should at least inspire confidence not only to re-enact this measure but to have the Legislature make other provisions of law of nearly as great consequence, among which the further protection of the deer may be cited, especially as the law prohibiting the killing of deer expires in 1903 by limitation.

Status of Game. — The information that comes to this commission from many sources is substantially unanimous in proclaiming that game of nearly all kinds has been more abundant this year than for a long time. With almost no exception this is the testimony given by the deputies throughout the State, who not only have the opportunity to become familiar with local conditions but some of them travel extensively, visiting all parts of the State, and by observation and conversation with sportsmen gain a comprehensive general knowledge of game conditions throughout the Commonwealth. It may be stated, however, in this connection that the statements from deputies regarding game, used in this report, will apply chiefly or wholly to their own towns and contiguous territory unless otherwise specified.

The increase of game birds and animals hereafter to be noticed in some detail is attributable in large part to the vigorous enforcement of law in recent years; for it goes without saying that the best laws ever enacted are of little or no efficacy unless they are enforced in a manner that will compel respect for them.

While the increase in the partridge and quail is remarkable, and really without parallel in the history of the State, it is also true that there has been a gratifying addition to the numbers of other species which are protected to a less degree than the partridge and the woodcock. There is a temp-

tation to elaborate on this subject, but conciseness will not admit of it.

The Boston "Post" of Nov. 30, 1902, says:—

Sportsmen who cannot spare the time to take a hunting trip to Maine or New Hampshire can find some excellent gunning of small game within twenty miles of Boston. Within the past three or four years partridge, quail and woodcock have been on the increase in the suburban towns, and hunters with good braces of game may be seen almost any day on the great thoroughfares leading into Boston. . . .

Around Lynn there are some excellent woods where good braces of game can be found. The ruffed grouse, the acknowledged king of game birds, are numerous about this section. This bird is seen at its best in the rough, uneven covers where successful pursuit calls for the highest class of work from both dog and hunter.

The cutting off of much of the pine and hemlock on the lands of the State has had a potent influence in the depletion of the grouse covers, which furnish him a refuge when hard pressed and a retreat during the severe cold of winter.

Around many of the lakes within easy reach of Boston there is good quail shooting. The quail do most of their feeding on the open fields, and, when started there, offer easy shooting.

The following brief extracts from reports of deputies apply to game in general, and may properly precede the more specific statements concerning the abundance of certain kinds of game, even though all are substantially alike, so far as declaring an increase is concerned:—

Game is not very plentiful. — EDWARD F. SNOW, Nantucket.

There is a general increase in game, especially in pheasants and quail. — JAMES LOOK, West Tisbury.

Quail, partridge, gray squirrels and song birds are very plentiful. — B. F. RICHARDS, Weymouth Heights.

Quail and partridge were quite numerous this fall, as well as the gray squirrel and rabbit. — W. I. JAMES, Hingham.

Quail, partridge, gray squirrels and rabbits are plenty, and wild fowl are coming in large numbers. — OTIS THAYER, Quincy.

Game of all kinds is very plenty this fall. — GEORGE H. HASSAM, Needham.

Game birds are more plentiful here this year than ever before.—
F. H. HILL, Attleborough.

The insectivorous and song birds, especially the robin, have been plentiful. — HARRY A. DICKERMAN, Taunton.

An interesting happening of the early fall was the observation by your deputy, Mr. Samuel Parker, of this town, of at least one flock of wild pigeons. There is no doubt of the accuracy of this identification, as Mr. Parker was familiar with these birds in the old days when they were plentiful, and as he saw this flock more than once. — GEORGE M. POLAND, Wakefield.

Game is rapidly increasing,—quail and rabbits very much so.—
L. E. REED, South Acton.

Quail, partridge and rabbits are plentiful. Woodcock and gray squirrels are very scarce.—LOUIS C. GORDON, Groveland.

Partridge, quail, gray squirrels and rabbits are very plentiful. Song birds are increasing very rapidly.—WM. J. TOOHEY, North Andover.

Insectivorous and song birds have increased wonderfully.—
WILLIAM W. NIXON, Gloucester.

Game is more plentiful than it has been for years, especially partridge and quail, also gray squirrels and rabbits. Woodcock are scarce.—HERBERT E. MCINTIRE, Reading.

Partridge are more plentiful, but quail and woodcock are seldom seen. Squirrels of all kinds and rabbits are flourishing.—A. J. KENNEDY, Lancaster.

Quail and gray squirrels are plenty. I have seen no ducks and but one flock of geese this fall. There are very few partridge.—
CHARLES A. WHITE, Ludlow.

Game is quite plentiful, especially quail.—M. T. MCCARTHY, Leicester.

Game is more plentiful than for a number of years.—FRANK E. SMITH, Douglas.

As to game, I am pleased to voice the sentiments of every sportsman whom I come in contact with, in saying that game is more abun-

dant this year than for the past twenty years. The hunters who visit the covers this fall have been rewarded, and they are loud in their praise of the good work done by the commission in the enforcement of laws which, together with the anti-sale law, is responsible for the large amount of game birds. — JOHN F. LUMAN, Palmer.

Deputy A. L. Pratt of Belchertown, under the head of Remarks in his report for the week ending October 5, made the following statement: —

I find that partridge, quail, gray squirrels and rabbits are more plentiful than I have ever known them.

I find game quite plentiful and on the increase. — EDWARD MILLER, Northampton.

The law prohibiting the sale of partridge has done the business up here, as they were plentiful this last fall. — E. C. HALL, Buckland.

Game of all kinds is more plentiful than ever before. — A. CAMPBELL, Oxford.

Coons, foxes, rabbits and squirrels are also abundant, and, with the exception of foxes, are holding their own as to number. — L. E. RUBERG, Hoosac Tunnel.

Writing on August 17, Deputy Nichols said: —

A Mr. Tyron of Monterey reports seeing fifteen to twenty broods of partridge about that place. They also report quail very plenty throughout the southern part of Berkshire County. A number of quail have been seen about Greenfield and Clarksburg, the extreme western part of the State. This is something unusual. . . . On my trip a week ago, with deputies Luman and Shea, on the plains near Willimansett I saw and heard a number of quail; also a flock of wild ducks. Squirrels will be very plentiful in this section of the State this fall.

Sea and Shore Birds. — Taking the State and the season as a whole there has been at least an average abundance of sea and shore birds. The flights have not always been satisfactory in certain sections, and possibly this condition may have continued in exceptional instances for the season or thereabouts. On the other hand, birds have been reported unusually abun-

dant in some localities, notably so in Quincy Bay and contiguous waters, and the chances for good shooting were said to have never been better.

The continuance of remarkably fine weather for the season through October and November has been to the advantage of shore hunters, at least to the extent that their sport has not been interfered with this autumn by heavy storms and gales to the degree that is common. This has been specially advantageous to those who depend chiefly on going out in boats to seek flocks of sea birds.

While this section deals more especially with shore bird shooting as a sport, and the occurrence of the common varieties of birds ordinarily sought by hunters, mention may appropriately be made of the fact that, on April 15, 1902, Mr. William A. Cary shot a fine specimen of the black brant (*Bernicla nigricans*) at Chatham. This is said to be the second occurrence of this species in this State, for it is a Pacific bird and is a straggler of exceeding rarity on the Atlantic seaboard.

The following references to sea and shore birds are extracted from the reports of the deputies, and, while not covering the whole coast, afford information as to conditions in several localities: —

Duck shooting has been good this fall; there are probably 5,000 red head and blue bills here now. — JOHN E. HOWLAND, Vineyard Haven.

Wild fowl have been very plenty this fall. — FRANK SERRILLA, Boston.

Beach shooting has been excellent this summer. — GEORGE W. GOLDSMITH, Beverly.

The hunting of water fowl at Ipswich Bay has made fine sport for those that like that kind of shooting. The birds have been plentiful this season. — WM. W. NIXON, Gloucester.

Partridge, Woodcock and Quail. — Such a vast amount of material relating to the increased abundance of partridge and quail is available that much of it must be excluded from consideration here for the sake of brevity. In the multitude of

testimony under this head, condensed though it may be here, there is incontrovertible evidence of the effect of the non-sale law on partridge and woodcock, even to the extent of probably causing an increase in quail, which has been one of the most remarkable incidents in the recent history of game in this State. When the non-sale law was enacted the pot hunter's vocation was largely circumscribed if not abolished. As a consequence, the quail, or "bob white" as this species is familiarly called, shared in the good fortune more specifically intended for his bigger congeners, the partridge and woodcock. For, while the quail could still be sold seven months of the year, the hunting of this species alone was scarcely sufficient to prove a paying attraction to the market hunter, debarred by law from selling partridge. As a result the hunter for revenue only has, as a rule, found it necessary to seek other employment that keeps him out of the covers, and "bob white" has undoubtedly benefited from comparative freedom from the persistent attacks of the market purveyor, who, while formerly chiefly intent on bagging partridge, was not averse to adding to his game bag every one of the smaller birds that he could gather in. Comparative immunity from the attacks of those who did not hunt for sport but for the market, and took the last bird in a covey if possible, together with the rather favorable weather conditions of the past two winters, have combined to bring such an abundance and wide distribution of quail in this State as has not been known before for many years, if ever. In enumerating the causes of this desirable condition mention should not be omitted of the public-spirited work of many clubs or citizens, who have liberally contributed for the purpose of having quail imported into this State from other sections of the country. But, while freely conceding the value and importance of what has thus been done, it may justly be said that this is only a continuation of the effort along the same line that has been carried on for a number of years, without ever producing the conditions that happily have existed this year, and, to a slighter degree, in 1901. This seems to suggest that other causes have contributed chiefly to the increase noted, as well as to the fact that "bob white's" whistle has been a common note this year

in the Berkshire hills and fields, where heretofore the quail has been rare or entirely absent. It may never become an important factor there, but its appearance in that section of the State is noteworthy.

The woodcock, though breeding here to a limited degree and reported more than usually plentiful in some sections, is not anything like generally abundant; indeed, it has been very scarce in most sections of the State. The effort to protect it here from the market hunter is a most commendable one, and should be continued. The fact that it appears within our borders chiefly as a migrant and that it is deprived of reasonable protection in some of the States where it winters, furnishes additional reasons why all that is practicable should be done here to save from extinction this interesting and valuable species. The example of this State and other game-protecting States cannot fail to influence action where it is most needed, and we cannot be insensible to the position Massachusetts takes in this matter, in view of what her action may mean to other commonwealths.

The extracts from deputies' letters and reports which are quoted under this head show rather comprehensively the status of partridge, woodcock and quail in the eastern section of the State. It is pertinent to state, however, that in this region the quail, because of its relative abundance, bears a more important relation to the game supply than it occupies in the central and western sections of the State. Indeed, in many towns on the coast and adjacent thereto the quail is the one species of land game bird, other than the shore, marsh or beach varieties, that is relied upon to furnish sport, for neither the partridge nor the woodcock occur in those places in sufficient numbers to be an important object for the pursuit of the hunter. So near to extermination had the partridge been brought in these localities, because of insufficient protection, that it has failed to gain satisfactorily in numbers in recent years, for the simple reason that there were few if any breeders left there to renew and increase the stock, — an instructive lesson of the danger incurred in allowing this species to be again exposed to such conditions as brought this result.

Fortunately, however, the condition above referred to is

limited, and many of the eastern covers afford excellent partridge shooting. Here the increase of this bird compares favorably with any part of the State, and notably demonstrates the remarkable local habits of the species.

Deputy William C. Dunham of Nantucket, writing on October 11 concerning the game conditions on that island, says: —

There is a very large quantity of quail on the island. You can see them running in the wheel ruts when you are driving out. They are very tame. We have more song birds this summer than we have had for a number of years.

Quail are more plentiful than last year. Partridge do not gain at all; some conditions were not right for them on this island. They are frequently shot, and are very thin. — JOHN E. HOWLAND, Vineyard Haven.

Partridge are still on the increase and will continue to increase if the anti-sale law remains as it now is. Quail were more plentiful this season than they have been for years. — W. O. SOUTHER, Jr., Cohasset.

Quail are numerous, but few partridge have been seen this year. — D. R. SIMMONS, Cochesett.

Game is quite plentiful this year, especially partridge and quail. — A. T. HOLLINSHEAD, Braintree.

Partridge have been more plentiful this fall than they have been for a number of years; quail are more abundant, while woodcock are very scarce. — W. H. COOK, Needham.

Quail are apparently more plentiful this year than for several years past. — R. W. BUFFINGTON, Swansea.

Partridge are increasing quite fast. — ELMER D. YOUNG, Swansea.

Partridge do not seem to be increasing. — H. A. BENT, Franklin.

Partridge and quail are plentiful in this vicinity this fall. Woodcock are very scarce and wood ducks are decreasing rapidly. — HARRY A. DICKERMAN, Taunton.

Quail have been very plenty in this and neighboring towns, and are on the increase in spite of considerable shooting, but partridge are scarce. — J. W. BAILEY, Arlington.

Partridge and quail are increasing. — ALFRED GREENQUIST, Roslindale.

Partridge around here are very plenty. I have seen more quail around here this year than I have for ten years. Woodcock are very scarce around this section. — GEORGE WILLIAMS, Lynnfield.

Deputy Thomas L. Burney, in his report for the week ending October 5, made the following statements:—

Wednesday, October 1, was the opening day on game, and though it was very stormy a few men went out, but soon gave it up and came home wet through but with no birds. Thursday being pleasant, a large number were out. They report quail very small and not so plentiful in certain localities where last year they were very plentiful. The scarcity in those localities is due no doubt to the fact that the Lynn Fish and Game Association was unable to procure birds for stocking purposes this spring. Other places report quail very plentiful, more so than last year. Every one who has been in the woods after partridge say they have started more birds this season so far than they did all of last fall. I came through the woods from Lynnfield Thursday, the 2d, and started more partridge than I ever did in any one day in this part of the State. There have been no reports of large bags so far. The quail are small, and sportsmen will not or do not care to kill them until the last of the month. The leaves are still on in the woods, and but few partridge have been killed. All sportsmen whom I have talked with agree that the increase of the partridge is due to the anti-sale law.

The season of 1902 has been satisfactory as regards partridge and quail. In spite of their continuous pursuit during the open season our partridge maintain their numbers surprisingly well, and quail have noticeably increased. There seems to have been no flight of woodcock here this fall. A suggestion as to the care of our quail during the coming winter seems to be worth making. It is believed that the increase of quail in northern Massachusetts is due to the recent mild winters and slight snow fall. At any rate, the deep snows of a severe winter do more to exterminate quail than all the rest of the destructive forces to which they are exposed. Now if the coming winter should bring heavy snow, a little grain left where

the flocks can find it will enable many quail to live through the winter that would otherwise die of starvation in the snow; and as every flock that winters is pretty sure to result in two or three new flocks in the spring, sportsmen will get large returns for a little grain. — GEORGE M. POLAND, Wakefield.

Partridge are gaining in numbers and quail are quite plentiful. — ETHAN BOTHWELL, Northborough.

Quail are more plentiful in this section than a year ago. Partridge about the same. — HIRAM A. YOUNG, Beverly.

Deputy Fred. S. Knowlton of Wenham, writing on September 14 regarding quail, says: —

They are very plenty; in fact, there are more quail than I have ever seen before.

In his annual report he says: —

Game, as a rule, is on the increase. The past summer there have been three or four broods of quail on our farm. . . . Partridge are very plentiful.

Quail, partridge and woodcock are on the increase. — H. THIEMANN, Manchester.

Partridge are quite numerous at West Gloucester, Magnolia and Manchester. Quail are plentiful, but hard to get, owing to the rough country and plenty of brush. — WM. W. NIXON, Gloucester.

Partridge are very plentiful, and there have been some good woodcock and quail shooting in this vicinity this season. — E. T. WILDES, Georgetown.

Partridge and quail were quite plentiful, and the fall shooting has been good. — FRED J. BROWN, Woburn.

Quail are more plentiful than they have been for several years. — E. H. SHATTUCK, Andover.

Game birds are very plentiful, especially quail. — A. J. RAUSCH, Lawrence.

I find a plentiful amount of game in the partridge and woodcock line. — EDWARD MAILLOUX, Haverhill.

Partridge are more plentiful. Quail and woodcock are seldom seen. — A. J. KENNEDY, Lancaster.

The quail about here are very plenty. Partridge are more numerous than for four or five years, while woodcock are reported very scarce. — W. N. PRENTISS, Milford.

The Smith brothers caught 13 partridges, 12 quail and 1 rabbit on November 4. — JOHN L. MARTIN, Milford.

I find more partridge than I have seen for some time before. — GEORGE A. DUDLEY, Hudson.

Not for many years have game birds been so plentiful in the central section of the State. This is substantially the unanimous testimony of experienced men, both hunters and deputies, many of whom declare emphatically that they never before have seen quail so abundant and never expected to see so many partridge as were in the covers this autumn. Thus, while the conditions may not equal those in Massachusetts in 1634, when William Wood declared in his "New England Prospects" that partridge and heathcocks were so numerous that "he that is a husband, and will be stirring betime, may kill half a dozen in a morning," still, more satisfactory results have been obtained than could have possibly been anticipated three years ago.

The "National Sportsman" for November quotes the following from a Spencer writer: —

I have been out hunting quite a number of times, and the smallest number of partridge I have flushed was 17, which was in one afternoon. All the other days I have found from 20 to 30, and it is a fact that we have more partridge in Worcester County than we had last year, regardless of what others may say. I have hunted partridge for twenty years in Worcester County and I ought to know. In regard to quail, there never were so many in this county as there are to-day.

This is fully vouched for in the following extracts from letters and reports of deputies of this commission: —

I have been out hunting several times with men who doubted that partridge were on the increase, and we have flushed from 12 to 30 in an afternoon. — A. D. PUTNAM, Spencer.

Partridge are very plenty. Quail in abundance. — H. A. MOWER, Worcester.

I am pleased to report the increase of game, especially quail and partridge. — F. J. PROCTOR, Fitchburg.

Partridge and quail are more plentiful this year, but woodcock are rather scarce. — DANIEL A. WARREN, West Upton.

Deputy George Pogue of Grafton, writing on October 8, says : —

I never heard of quail so plenty, and there is a good supply of partridge. I also hear good reports of pheasants.

In his annual report he says : —

Partridge needs all of December, as two out of three partridge killed in December are hen birds, and those are the birds that need protection.

Game has been quite plentiful, especially partridge and quail, and good bags have been made of both varieties of birds. — EDWARD R. CLARK, Clinton.

I find partridge in abundance in all sections and quail plentiful. . . . It is a frequent thing to see a hunter come into town with from 12 to 15 birds, and I saw one man return with 18 partridge and 4 rabbits after a run of seven hours. — DENNIS SHEA, Ware.

Partridge are at least holding their own, and quail are on the increase. — FRED S. CASAVANT, Gardner.

I think there are more quail and partridge to be found in this vicinity than for a number of years. — W. S. WHEELER, Springfield.

Game is increasing in this district, especially partridge. — WM. G. NICHOLL, Northampton.

The following selected statements will give a fairly comprehensive idea of the abundance of game birds in the western section of the State : —

The Pittsfield "Eagle" of Sept. 13, 1902, published the following, which foreshadowed the game conditions in that section at the opening of the hunting season : —

Numerous coveys of partridges have been seen in the covers in the outskirts of the city during the past few days, and it is supposed that the birds are coming down from the mountains and highlands, where they went during the nesting season to avoid the swampy covers on the lowlands which, owing to the heavy rain of the early summer, were many of them unsuitable to the raising of young. During the past two years, when shooting partridges for the market has been prohibited, the number of old birds has increased to an extent unprecedented in years, and sportsmen can now go out with the assurance of getting good bags.

The anticipations of the hunters, as indicated by the above quotation, were fully realized.

The November number of the "National Sportsman" quotes a Pittsfield correspondent as follows: —

The season opens on birds very good. Some of the boys have made good bags. J. H. Wood and son caught 12 the first day. One party at New Ashford captured 17. . . . Mr. Wood states that he has had better bird shooting this fall than he has had in years. He also reports woodcock very plenty.

It also has the following: —

A business man of Springfield went out to Greenwich recently hunting and returned to Springfield last night. I heard him tell that he kept count of the partridge that he scared up during the day, and that he flushed up 40 birds in all. He said that he never saw so many woodcock and quail as there are this fall.

There is temptation to quote more extensively concerning game in the Berkshire covers, for the hill sides and swamps not only afford excellent shelter for birds, but conditions near our western border, where Massachusetts meets New York, are specially important from the standpoint of the protection and increase of game.

The following statements from deputies are, however, of interest: —

Partridge and gray squirrels have been very plentiful this year. —
M. J. CRANSON, Buckland.

On October 8 Deputy A. M. Nichols wrote as follows : —

I heard to-day that a man in Shelburne Falls got 7 quail and 2 woodcock last week. These are the first quail that have been caught in Shelburne Falls in a number of years.

In a letter dated October 21 he says : —

I met President Russell of the Greenfield Rod and Gun Club the other evening coming into Greenfield. He and a friend that day got 12 birds. There were never so many birds in the western part of the State as there are this season.

He adds the following in his annual report : —

Quail have been seen all through this section this season, and this is something unusual. It has been the best partridge season we have had in years. Woodcock have not been as plentiful as in years past, on account of the very wet season.

There will be a large stock of partridge left over. Woodcock are scarce. There was a large nesting, but they were away before the law was off. — W. J. Cross, Becket.

Partridge have had a hard year, on account of the wet weather, and the flocks are small but quite abundant, and there seems to be as good a showing of birds as for several years. Quail are getting into North Berkshire more and more each year, and were quite abundant in some localities this fall. — L. E. RUBERG, Hoosac Tunnel.

Deputy Dwight M. Couch of Pittsfield, in his report dated October 5, says : —

Game in this section is quite plenty, partridge and woodcock in particular.

Pheasants. — Although pheasants may not yet be classed as game birds of this State, in the sense that they can be legally hunted and killed, their prospective status as such entitles them to special notice in this report, not only because the State has taken a large interest in the propagation of the Mongolian pheasant, but also because the effort made has met with such marked success recently that this beautiful game species gives promise of occupying in the future a very prominent

position among the birds of the Commonwealth that attract the hunter's skill and furnish him with an additional choice article of food.

The reports received this year show conclusively that the pheasant is doing well in all sections of the State, and the very encouraging statements sent to us last year are duplicated or excelled. There is reason to believe it is breeding successfully in those localities where it has been placed; also that it has lived through the winters as well, apparently, as our native game birds. As a rule, it rears large broods, 10 to 18 chicks, and the young birds have every appearance of strength and hardiness. There seem to be few losses in the wild state, outside of those caused by enemies, and, although some birds may be killed by foxes, hawks, owls, etc., and also by hunters who have a disposition to ignore the law, the species seems to have acquired a foothold. Therefore, aside from the fact that there is less wild land here and more hunters in a given area, there is no apparent reason why the Mongolian pheasant should not do almost as well here as in Oregon, where it is concededly the foremost game bird of the State.

The following brief notices of it embody sufficient facts to indicate its status in various localities: —

Deputy William C. Dunham of Nantucket, writing on October 11 concerning the game conditions on that island, says: —

There are 3 old pheasants and a brood of young pheasants, 4 in number, on the west side of the island, in what we call the Gardner Woods.

The pheasants are reported doing well on the Cape. — S. B. RICH, Provincetown.

I am pleased to be able to report the wonderful progress the Mongolian pheasant is making in this section of the State. Numerous reports of the number of these birds which were being seen daily in the towns of Topsfield and Wenham came to me, and I started to investigate some of them. On Saturday, November 15, in company with Deputy Knowlton, of Wenham, I started for Topsfield. We crossed Wenham swamp on our way as a short cut, but before we got to Topsfield I was satisfied that the reports were not exaggerated. We started a number of the birds, 15 or 16 of which we saw, my

dog pointing a bunch of 5 at one time. A number got up wild in the brush which we could not see. I have started them also in Danvers, Middleton and Rockport. They are reported plentiful in Magnolia and Manchester. Mr. Daniel Goodwin of Newburyport reports seven or eight broods from those liberated in that vicinity. — THOMAS L. BURNEY, Lynn.

The pheasants seem to be doing well; in the spring of the year the call of the bird is frequently heard, and in July I located two broods of young birds, one in which I counted 9, all able to fly strongly, though not much larger than quail. — J. W. BAILEY, Arlington.

Pheasants have been seen often the last few days, . . . and are breeding fast, one flock having 5 females in it. — FRED S. KNOWLTON, Wenham.

The Mongolian pheasants that were liberated by your commission are doing well and are seen quite frequently. — HERBERT E. MCINTIRE, Reading.

Pheasants seem to be doing well and increasing. — F. G. LEFAVOUR, Beverly.

Pheasants have done well in this section of the State. — HERMANN THIEMANN, Manchester.

Pheasants are seen almost every day. — WM. W. NIXON, Gloucester.

Pheasants are all right and increasing fast; 10 have been seen in one flock. — L. C. GORDON, Groveland.

I have seen numbers of pheasants around Boxford and Andover. — A. J. RAUSCH, Lawrence.

I have heard of pheasants attempting to hatch their young in the woods west of the city, only to be disturbed and their nests destroyed by dogs, taken out for the purpose of "training," as claimed by owners. A law should be passed prohibiting owners of dogs from roaming the woods during the closed season, and thus destroying nests as well as young birds. — FRED J. BROWN, Woburn.

Pheasants have been seen about here several times. — WILLIAM J. TOOHEY, North Andover.



The pheasants I put out I think are all right. I have seen quite a number when I have been hunting. I found one lot of ten birds within half a mile of the centre of the town, and have seen from 3 to 5 in different places. — GEORGE POGUE, Grafton.

There was a nice brood of pheasants hatched here this summer and most all lived. — M. T. McCARTHY, Leicester.

Pheasants which were liberated two years ago are seen in broods in various sections I have visited, from the Cape to the most western part of the State. — JOHN F. LUMAN, Palmer.

Pheasants are seen here occasionally. — FRED S. CASAVANT, Gardner.

I have seen quite a number of pheasants in this vicinity this fall. — WM. G. NICHOLL, Northampton.

Pheasants are being seen in every section. — A. M. NICHOLS, North Adams.

The following statements from citizens indicate not only the presence of pheasants but the interest shown in them: —

Mr. George H. Sweetnam, of Bedford, writing on November 24 in reference to another matter, made the following statement: —

A beautiful pheasant flew by the rear of my house the other morning at great speed, alighting in the brush but a short distance away. Long may they fly!

Mr. E. M. Brastow, of Wrentham, writing on October 13, says: —

As I have been very busy I cannot tell you of my own knowledge of the pheasants which you sent here the 25th of September, 1901, but I have it from a reliable person that there is one flock of 5, there may be more, but he certainly counted 5. I think you will remember of my writing you last year about them and saying one of them with a flock of quail fed with the hens at a farm house. That bird, I am afraid, is dead. Last spring we had several extensive forest fires, one of them on this farm, and on the morning of the fire the pheasant was seen, but not since. So I think it perished.

Deer. — There is cumulative evidence that the deer is becoming more common in this State than was probably deemed

possible only a few years ago. And it is a remarkable fact that, even now, many are disposed to believe that the wild deer reported to have been seen from time to time in various localities must be animals which have escaped from parks or reservations. In a State populated as Massachusetts is, it is not, perhaps, remarkable that the occurrence of wild deer here and there, often in close proximity to large towns, and indeed almost within sight of the gilded dome on Beacon Hill, is something difficult to either believe or understand. There is, however, indisputable evidence of this, and, although this animal is not yet deemed sufficiently numerous to justify the hunting of it, there is a strong probability that, with continued protection for a brief time longer, the hunting of it for a few days each fall may be permitted without the risk of exterminating a species which should be kept in the State covers as long as practicable. Without protection extermination will follow with certainty and expedition.

Complaint has been made by several persons of damage done to fruit trees and growing crops, and inquiries have been received by the commission asking if the State would pay for the alleged loss.

There seems to be a division of opinion, among those presumably conversant with the habits of the deer, regarding the destruction caused by this animal in Massachusetts. Thus, while the claim has been made that the deer is not likely to destroy fruit or eat cabbage, etc., it has been urged on the other hand by a citizen of Vermont, who lives "in a deer country" and asserts he knows what he is "talking about," that "deer eat . . . about everything that grows in a farmer's field and garden, and will stay by such fodder until it is all eaten up." *

However this may be, we are not aware that provision has ever been made by any State to pay for alleged damages of this nature by deer, and information has come to us that some of the public-spirited farmers of this State have emphatically declared they were opposed to anything that would permit the killing of these animals, and preferred instead to submit to any small loss that came to them. It is too much to expect that

* "Forest and Stream," March 1, 1902.

all should take a similar view under trying circumstances, but the fact that some prefer small loss to killing the animals indicates the esteem in which the deer are held by a few, at least, who may have most cause for complaint.

A mass of data is available showing the occurrence of deer in various sections of the State, from Cape Cod to the Berkshire hills. It must suffice, however, to quote a few extracts from the press and concise statements from the deputies and others.

The Greenfield "Gazette and Courier" of Oct. 11, 1902, says: —

There never was a year during the memory of the present generation when deer were so frequently seen in western Massachusetts and the adjacent part of Vermont as this fall. A herd of 4 was noticed in this vicinity recently, and last week they were seen in the woods near Factory Hollow.

The North Adams "Transcript" of July 15, 1902, among its Williamstown items has the following: —

Engineer Blackall and Fireman Leonard saw 3 deer on the railroad track a short distance east of the depot Saturday. The men were rounding the curve east of the depot on an engine, when they came upon the animals grazing beside the track. A blow of the whistle frightened the deer, and they bounded across the highway and up the side of East mountain.

The same paper, on July 21, 1902, said: —

Two deer were seen this morning in Greylock, a short distance from the home of W. W. Richmond. They were moving quietly along and appeared not to be frightened.

Among the Greenfield items in the Springfield "Union" of Aug. 5, 1902, it was stated: —

Henry Bates saw a big deer in the meadows near E. N. Larrabee's yesterday morning. The animal showed no fear and took plenty of time in walking out of the way.

The Pittsfield "Journal" of Aug. 14, 1902, stated: —

A large deer strolled into the yard in front of the residence of Col. A. L. Hopkins in Williamstown Sunday and fed there while Colonel

Hopkins stood on the piazza. The deer was a large buck and was watched with admiration until he took fright and hastened away.

“Edward Deland saw 3 deer near his house in Monterey Sunday morning,” says the Pittsfield “Eagle” of Aug. 16, 1902.

The North Adams “Transcript” of March 24, 1902, notes :—

Game Warden Nichols while going through the woods west of the city Sunday surprised a large buck deer, which he attempted to drive into the mountain for its own protection from dogs. He found the animal so tame that it was with difficulty headed away from civilization. The animal was one of the handsomest that has been seen in this vicinity.

The next day the “Transcript” published the following among its Williamstown news :—

George Larabee saw a herd of 14 deer on the Richmond lot just above White Oaks Tuesday while he was returning from the mountain where he had been cutting wood. The deer were grazing in the lot and were entirely unconscious of his approach until he stepped upon a twig, when they scattered.

Mr. A. D. Putnam in his report for the week ending July 13 says :—

Deer have been seen very often in Spencer and Brookfield within the last week.

Mr. John E. Marley, of Dracut, in a letter dated November 5, makes the following statements concerning deer :—

Deer are increasing here. I have seen 8 so far this season, 1 yesterday morning swimming across Maskupic Lake. It seemed quite tame and came within forty yards of me.

W. L. Smith, of Concord, reports that 2 deer have been seen in that town. They seemed quite tame and no one had any idea of molesting them.

The following references to the occurrence of deer are extracted from the annual reports of the deputies :—

Several deer have been sighted not far from here.—D. R. SIMMONS, Cochesett.

Have seen several deer, but they seem to be undisturbed as they are very tame. — A. T. MOORS, Briggsville.

Deer have been seen every week for the past two months (prior to November 18) ; 3 were seen last Friday morning in Groveland near the Georgetown line. — L. C. GORDON, Groveland.

Deer are frequently seen. One man saw 4 in the road together one morning. Several does have been seen with fawns. One had a pair. — E. T. WILDES, Georgetown.

Six deer have been seen about the town at different times this year. — WM. J. TOOHEY, North Andover.

Two deer were reported seen at West Gloucester this summer. — WILLIAM W. NIXON, Gloucester.

Deer have frequently been seen this year, 1 or 2 at a time, and in one instance this fall a gentleman in driving twenty miles saw 5. — L. E. REED, South Acton.

Two deer have been seen in the northwestern part of the town. — H. E. MCINTIRE, Reading.

There is a fine deer right here under my very eyes. . . . She has been here all summer. — JOHN L. MARTIN, Milford.

Deer are seen quite often, a buck being seen in the Hopedale Park lands on Sunday, November 9. — W. N. PRENTISS, Milford.

Deer are seen very often. — A. J. KENNEDY, Lancaster.

Deer are seen often. — FRANK E. SMITH, Douglas.

Deer are beginning to be seen almost in every section. Herds of 4 and 5 have been seen together, and it is not an uncommon thing to learn that a deer has been seen almost every day in one part or another. — JOHN F. LUMAN, Palmer.

A number of deer have been seen in this vicinity. — DANIEL A. WARREN, West Upton.

Deer are increasing and are seen almost daily. — R. F. SMITH, Uxbridge.

I have seen 24 live deer and 2 dead ones. — DENNIS SHEA, Ware.

Deer are seen frequently, and if the dogs would leave them alone they would increase rapidly. — FRED S. CASAVANT, Gardner.

I have seen 3 deer in my orchard at one time this fall. — CHARLES A. WHITE, Ludlow.

Deer are frequently seen and are evidently on the increase. — WM. G. NICHOLL, Northampton.

Deer are increasing rapidly. One farmer within three miles of my house saw 7 in one day. — E. C. HALL, Buckland.

Deer are getting very plentiful, being seen quite often. — M. J. CRANSON, Buckland.

Deer are on the increase and are rather tame. — W. J. CROSS, Becket.

Deer are abundant and are not troubled by dogs as much as formerly, being very tame and feeding around the farm houses without fear. — L. E. RUBERG, Hoosac Tunnel.

Deer are increasing very rapidly, and the sportsmen are very much in favor of protecting them another five years. — A. M. NICHOLS, North Adams.

There have been several cases reported of deer having been accidentally killed, and probably several have been run to death by dogs. One fell from a bridge in the vicinity of the Junction, near Pittsfield, and broke its leg about March 18. Authority was given to kill the animal.

The following item appeared in the North Adams "Transcript" of Aug. 25, 1902: —

As the passenger train which reaches this city from Pittsfield at 8.20 A.M. was coming down the valley this morning a deer appeared on the track about a mile south of Cheshire harbor. It ran on the track ahead of the engine for some distance, and then bounded off and ran into a wire fence and then fell. A south-bound freight train passed the place a short time afterward, and the train was stopped. The crew found that the deer's neck was broken, but it was still alive.

The animal was placed aboard the train and taken to Cheshire, where it was left at the freight house, and Game Warden A. M.

Nichols of this city was notified. He went to Cheshire, and after ascertaining the condition of the deer he ordered it killed. It was a doe, about two years old, and was a fine specimen.

Warden Nichols has notified the state game commissioners, who will instruct him concerning the disposition of the carcass.

At Woods Hole a deer with broken legs was found on the railroad track, where it had jumped or fallen from a high embankment. It was killed by authority of the commission.

A deer jumped into a deep sandhole at Georgetown, probably at night, and had to be killed.

A deer which had evidently been driven into the water by dogs at Scituate was rescued by Mr. A. W. Phillips; subsequently it was liberated in the woods by the deputies of the commission.

A deer was rescued from drowning in Barnstable Bay late in November by Capt. F. W. Dexter of the naphtha launch "Quartette," of Lynn, which at the time lay off Barnstable Point light engaged in herring fishing. The animal was kept for nearly a week, until the vessel returned home, when Captain Dexter reported having it on board to the commission, and Deputy Burney was instructed to take charge of its liberation. This was a most remarkable case. The deer had evidently been driven into the water by either dogs or men, and was swimming straight out to sea when seen. Captain Dexter deserves commendation for his humane treatment of the animal, which had to be rubbed to restore its exhausted energies after being taken on board the "Quartette;" and also for his courtesy in promptly reporting it after his arrival.

It is regrettable that this deer, the preservation of which reflected so much credit on Captain Dexter, should have been killed by John T. Collins, of Maplewood, on December 11, only a few days after the animal was liberated by Deputy Burney, who not only brought Collins into court to answer for his violation of law, but quickly recognized the animal by a scar he had noticed when he took it from the "Quartette."

The Belgian Hare.—The Belgian hare may apparently be now safely classed with the game animals of the State, although it is too early yet to speak with certainty of the results attending the efforts of the commission to stock the

State covers with this large species of rabbit, alike important as a game animal or a food product.

Commissioner Delano has reason to believe that the Belgian hares liberated in the vicinity of Marion are breeding satisfactorily. On August 17 he saw a young hare, probably about six weeks old, which had been captured by his cat, but was not injured beyond a slight scratch. He succeeded in securing the animal and liberating it at some distance in a swamp.

Mr. Myles Standish, of Rock, in a letter to Deputy Thayer, says: "There are lots of quail, and Belgian hares I have seen." He says two of the hares were killed by hounds, but evidently those that were not thus destroyed did well.

The following references to the Belgian hare by deputies of the commission are of interest in this connection:—

I liberated four pairs of Belgian hares. Three pairs have been seen at various times since then. — ROBERT E. BELCHER, Braintree.

Belgian hares that were liberated by the commission some two years ago have not been seen since. There are very few if any on the Cape. — WM. W. NIXON, Gloucester.

I have had good reports from hares liberated on the Cape last year. — S. B. RICH, Provincetown.

There appears to be ample evidence thus early that the Belgian hare, notwithstanding adverse predictions regarding it, may prove to be a very desirable addition to the game fauna of the State, if it succeeds in maintaining itself in spite of foxes, hounds and other species that may prey upon it. The following extracts from a long article in the Worcester Sunday "Telegram" of March 2, 1902, call attention to the game qualities of the Belgian hare, — presumably one of those liberated by the commission, or one of the progeny of those put out:—

It was the wont about Worcester, until Tuesday, to poke fun at the efforts of the Fish and Game Commissioners to stock the covers of the State with Belgians. Stories were told of how he was a coward at heart; how he would squat in front of the hounds, or take to

earth; how he had absolutely no right in the category of game animals, big or little, and how he was generally a low-down, good-for-nothing, worthless creature at best.

But since a Belgian hare has fallen to gun after a run of close to two hours ahead of hounds, and at that after he had been pricked with shot so that the fur was furrowed from his back, things look different when sportsmen begin to reconstruct their estimate of the Belgian. If he is no good in the poultry yard as a domestic animal, sportsmen are won over to the belief the Belgian in a wild state is about the proper sort of chap to have around. . . .

As far as is known, the Belgian hare killed four miles from Worcester in Tophet swamp last week is one of the first wild Belgian hares ever shot in this country. The eyes of experimenters and students have been upon the big rabbit for some years, and until now the experiment of breeding Belgians for stocking purposes at large has never been proved actually a success. To be sure, but one hare has been killed this year, as far as known, but the lone case proves at least that the hares will live in the roughness of Massachusetts swamps, and, above all, that they are game, after they have lived in the wild state for a year, and that the flesh is superb for food.

This incident naturally attracted the attention of hunters outside of Worcester, but probably less would have been thought of it except for the fact that it has been duplicated, in fact excelled, elsewhere.

Deputy Thomas L. Burney, in writing to the commission under date of October 25, says: —

Mr. Converse reports the killing of a full-grown Belgian hare in Lunenburg yesterday. The dogs ran him three or four hours of the afternoon before, and he says he went to ground, and was started next morning and killed soon after being started.

This hunt at Lunenburg was undoubtedly the most remarkable thing of its kind that has occurred in this State; in comparison with it the chase of the common cotton-tail rabbit seems insignificant. It is claimed that some of the best dogs obtainable were in the first day's chase, but all failed to capture the big rabbit, which proved not only a good runner, but is reputed to have a facility in side-jumping and doubling on its track that puts the best rabbit dogs at a disadvantage. It is worth noting that on the second day of the hunt at Lunenburg the

Belgian hare was shot, which accounts for the prompt ending of the adventure.

Although the day may be distant when the Belgian hare will be sufficiently numerous in this State to become anything like an important commercial factor, it may, nevertheless, not be inopportune to invite attention to its value as a fur-producing animal, although the prices paid for skins are not generally large.

There is authority for stating that citizens of Ghent, Belgium, have accumulated large fortunes by the exportation of rabbit skins to this country, where they are largely utilized. "The pelt," it is claimed, "when properly dyed in imitation of seal-skin, is much more valuable than the flesh of the rabbit."

Squirrels and Rabbits. — The condition of squirrels and rabbits in certain sections of the State, so far as their abundance as game is concerned, is shown in the following extracts from reports of the deputies: —

There are quite a number of gray squirrels, but have not seen very many rabbits. — A. T. HOLLINSHEAD, Braintree.

Rabbits are abundant here. Gray squirrels are plentiful and very large. — H. A. DICKERMAN, Taunton.

Rabbits are plentiful. — A. CROWELL, Needham.

Rabbits are not as plentiful as in former years, but I do not know why. — FRED S. KNOWLTON, Wenham.

Rabbits and gray squirrels are quite plentiful. — WM. W. NIXON, Gloucester.

Rabbits and squirrels are plenty. — GEORGE POGUE, Grafton.

Rabbits are not very plentiful. — H. A. BENT, Franklin.

I have seen more gray squirrels this fall than for many years. Rabbits are to be found in every hedgerow and brier patch. — W. N. PRENTISS, Milford.

Squirrels of all kinds and rabbits are flourishing. — A. J. KENNEDY, Lancaster.

Gray squirrels are peeping around from many branches, as is evidenced by seeing a man come in from a six hours' hunt with 24



BELGIAN HARE PENS AND PHEASANT COOPS AT WINCHESTER.

bushy tailed squirrels dangling along by his side. — DENNIS SHEA, Ware.

There are only a very few white rabbits found in this section. — M. J. CRANSON, Buckland.

There are more gray squirrels seen and taken this year than ever before. — A. M. NICHOLS, North Adams.

BREEDING GAME BIRDS AND ANIMALS.

Winchester. — The breeding of game animals was carried on at this experimental station as usual, there being no change or incident in this part of the work which deserves special mention. It was different, however, with game birds, in the breeding and rearing of which novel features have appeared, some of which may be considered advantageous, while others were startlingly alarming, and for a time threatened dire results. These will be discussed under their appropriate heads in the following paragraphs.

Pheasants. — For several reasons the promise of a successful season with pheasants had never been so good, and anticipation of large results in breeding and rearing were correspondingly high.

The discontinuance of blasting in the nearby quarry, which in recent years has proved so fatal to the incubation of pheasants, was an event that prompted hope and courage. Beside this the breeding stock was in first-rate condition in the spring, the pheasants of both sexes being hardy and vigorous to an unusual degree. This was probably due to the fact that from early in February they had been fed on a specially prepared food, with the object of increasing the fertility of the eggs if possible. While no perceptible improvement in this direction was secured, there was a marked increase in the vitality of the eggs.

The young pheasants came out very strong and remarkably healthy. This increased vigor of the chicks, and the exemption from loss formerly caused by blasting in the adjacent quarry, which had heretofore made the incubators almost useless, were sufficient reasons to promote expectation of more than ordinary success, an anticipation which would doubt-

less have been fully realized except for untoward conditions, as unexpected as they were difficult to deal with.

The pheasants began laying on March 25, which was fully two weeks earlier than usual. The first lot of eggs placed in incubation were set under bantam hens during the opening week of April.

But the inauguration of pheasant breeding at this exceptionally early date caused the commission to be confronted with a problem which it had not previously met, and one, for the time being, that seemed rather difficult to solve. So far as previous experience had furnished a basis for estimating, the bantams would succeed in hatching their broods at a time when it would be, under ordinary expected conditions, impossible to procure a supply of maggots, so vitally necessary for the pheasant chicks, which cannot be successfully raised without this food. How to get these was the question, and it must be confessed that there was doubt as to whether it could be answered. Fortunately an unexpected but welcome incident furnished the means of overcoming the difficulty, and at the same time offered a suggestion which may prove useful to others as well as to the commission.

In former reports the fact has been frequently stated that maggots, after they were fully grown and before they pass into the pupa stage, can be held for a long time in a condition of suspended development by keeping them in a temperature not above 40° F. The cold, while it does not kill the maggots, is sufficient to arrest their growth, — a matter of much moment at certain seasons of the year, when large quantities of live food are required. About the first of November, 1901, there remained in the refrigerator about a quart of maggots in this torpid condition, and in cleaning up in the fall these were thrown into a hole in the garden about six inches deep and covered with earth. Early in the spring it became necessary to construct a hotbed for raising early lettuce for the birds, and, in digging loam with which to cover the manure of the hotbed, these maggots, which had been buried the previous fall, were uncovered and thrown out. There were no indications of decay or injury among them; they were as bright and fresh as when they were put into the ground. At the same

time they showed no sign of life until exposed to the noonday sun, when there was ample evidence of returning vitality. The maggots were then carefully strewn over the manure of the hotbed and covered with about three inches of powdered earth. Fourteen days later, when the sash covering the hotbed was raised for ventilation, the space beneath it was seen to be full of flies. They swarmed out in all directions, lit on the south sides of trees and buildings, and, notwithstanding several rather severe frosts that occurred subsequently, they survived. They swarmed on meat that was put out on warm days and deposited their eggs, the result being that by the time the pheasant chicks were hatched there was a bountiful supply of maggots for them.

Aside from the possible advantage to bird breeders who may have to rely upon insect larva to feed young chicks, this experiment, if it may properly be so termed, should have much of interest to the embryologist. At any rate it seems to indicate to the ordinary layman the cause of the sudden appearance of swarms of insects in early spring, after a few days of warm weather. In such cases it is probable the larva have been held in a state of suspended animation and development since the previous fall, and only the quickening power of a warm sun is required to bring the metamorphosis and vigorous life so frequently observable in the winged myriads of spring.

The pheasant breeding season opened exceptionally early, as already related, and it began well. There was a large supply of eggs and the incubation seemed to prosper. At no time have the prospects looked so encouraging from the stand-point of chicks hatched and the strength and vigor of the young birds at the beginning of their existence. Had there been no extraordinary conditions to contend with, it may not be too much to say that the results might have been remarkable; but the introduction of the virulent infectious disease known as roup, through bringing into the station birds from the Sportsman's Show (hereafter to be discussed in detail), caused much trouble and disaster to the young pheasants, among which it spread so extensively that comparatively few were exempt from it, although, fortunately, it did not attack the adult birds.

The commission had no knowledge that the foreign birds

were suffering from roup when, late one afternoon, shortly after the close of the Sportsman's Show, they were received at Winchester, and immediately let loose in the several divisions of the brooder house. When the birds were examined next morning the Hungarian partridge were found to be hopelessly diseased. This was a severe blow, for, at the best, the seed of disease had been sown, and, whatever became of the foreign birds, there was apparently no escape from its ravages in the infected quarters provided for the young pheasants. The blow was all the more staggering because the roup had never previously appeared on the grounds at Winchester, and the commission was not prepared to deal with it. It is, however, well known to poultry breeders, and its infectious characteristics have been recognized. As a preliminary step interviews were had with those familiar with the disease, and from them was gathered all information possible of obtainment concerning the necessary care and treatment of birds suffering from roup. There was, unfortunately, a remarkable diversity of opinion and advice. No two prescribed the same remedies. All were tried faithfully until, at last, the conclusion was reluctantly reached that in this matter, as in most cases where drugs are relied upon to effect cures, people often honestly deceive themselves.

All of the chicks did not have the roup, and of those afflicted with it all did not die. Of eight coops of young pheasants set apart for experimentation and observation the chicks in seven were treated with various remedies. The birds in the eighth coop received no treatment, except that both chicks and coop were sprinkled with diluted sulpho-naphthol.

The result of these carefully conducted experiments showed conclusively that no effective remedy for roup has yet been discovered. The conclusion reached was that, aside from proper sanitary treatment, the birds do better if left alone, for a larger percentage survived in the eighth coop than in any other.

At no time were the birds received from the Sportsman's Show near the breeding pheasants, nor did any of the latter have any indications of being attacked with disease, as has already been intimated. All of the new birds were kept in the

brooder house only a brief time, sufficient for the preparation of coops on the hill for their accommodation, when they were removed as far as possible from the pheasants.

The ground where the roup occurred has been disinfected by putting air-slacked lime on it and spading it in about one foot deep; it is hoped no further manifestation of this disease will occur.

Notwithstanding the severe losses occasioned by the roup, amounting in the aggregate to 275 or 300 chicks, there is satisfaction in being able to say that a much larger number of pheasants were raised at Winchester than ever before. Two hundred and thirty-two were distributed, and about 100 of the weaker ones and those recovering from the roup were reserved for wintering and spring distribution. Some of these have succumbed to the severe weather in early December, so that only 60 young birds remain at the time this is written. It is entirely possible there may be a slight additional loss, but the hope is cherished that no further evil effect of the roup will be felt.

The first brood, which proved the strongest and best of the year, was reserved in large part to increase and improve the breeding stock.

Ruffed Grouse, Woodcock and Quail. — No eggs of the ruffed grouse were obtained this year. On March 6 partridge were received at Winchester shortly after the close of the Sportsman's Show, where they had been on exhibition, under the authorization and supervision of the commission. Four of these were males. Two of the latter and 1 of the females died. It was hoped the remaining female would pair with one of the males, and that it might thus be possible to record some interesting results of partridge breeding in captivity. The birds were kept as exclusive as the circumstances permitted, and everything practicable was done to make them feel at ease in their environment. All this availed nothing, however, for their native wildness was proof against any attempt to domesticate them to any degree whatever. They gave no indication of breeding; therefore they were liberated about the first of September, there being no object in keeping them longer.

Twelve quail were received from the Sportsman's Show,

through the courtesy of the management. Only one of the lot survived. It is probable that they might have all lived and thrived if they had not come in such close contact with the diseased foreign birds and suffered because of this contiguity.

Experiments with Foreign Game Birds. — For some time the commission has looked forward with interest and hopefulness to the time when it might have the opportunity to experiment at Winchester with the problem of rearing foreign game birds. It was, therefore, glad to avail itself of the opportunity presented, through the courtesy of the management of the Sportsman's Show, to see what could be done with certain species which were sent to Winchester soon after the close of the exhibition. This consignment included 9 French partridge, 7 Hungarian partridge and 2 Armenian partridge (all of the *Perdix* genus), beside American species of game birds elsewhere referred to.

All hopes of success that had been cherished regarding experiments with these birds were doomed to bitter disappointment, none the less keen because the conditions were such that practically nothing was learned, so that we are still really as far from knowing what may be accomplished with these species as before.

As already stated, the Hungarian partridge were badly diseased when they were received, and the malady which affected them was unavoidably transmitted to the other foreign birds that came with them. As a result only 3 of the French birds and 1 of the Armenian partridge survived. Those that died were dissected, and it was thus determined that only 1 of the lot was a female.

Whether those now living will endure the winter climate of New England will be determined. If they live that much will be settled, and it is still hoped they may mate next summer.

The Belgian Hare. — The Belgian hares have, as usual, been perfectly healthy, although they have been somewhat less prolific than last year. As yet neither study nor observation has indicated with certainty how long breeding rabbits of this species should be retained for propagation, having in mind the obtainment of the best results. There are indications, however, which suggest that if they are kept longer than four years their fertility is liable to be impaired.

The experiment was tried late in the summer of giving them their freedom for one or two weeks, and allowing them to run quite unrestricted about the large enclosure. The results were decidedly satisfactory.

Observation of the habits of the Belgian hare suggests the importance of either marketing these animals that are raised for food when they are about four months old, or separating the sexes, if that is practicable. If they are not kept separate they will begin to breed at that age.

The Belgian hare differs materially in its breeding habit from the American hare or the cotton-tail rabbit; for while the two latter do not breed in winter, the former bears young both winter and summer, regardless of the inclemencies of the weather. Inasmuch, however, as the parent Belgian hare digs her burrow deep into the ground, and lines her nest warmly for her young, the latter have a better chance for life in winter than otherwise might be the case.

The experience of the commission has proved the necessity of allowing the young to run free in a large enclosure as soon as they are weaned, without regard to weather. This increases their hardiness and is the surest way to maintain their health unimpaired.

Sutton. — The conditions attending the rearing of pheasants at Sutton were, happily, very different from those at Winchester. They were, however, not unattended with difficulties, nor is it to be expected that work of this kind will be. The experience gained will no doubt prove helpful in the future in securing immunity from all preventable losses.

Report of the Superintendent. — The results attained in breeding and rearing pheasants at Sutton, and many interesting facts and observations connected with the work, are detailed in the following report of the superintendent of the station: —

STATE FISH HATCHERY, WILKINSONVILLE P. O., SUTTON, MASS.,
Nov. 27, 1902.

To the Commissioners on Fisheries and Game.

GENTLEMEN: — The brood stock of pheasants, 9 cocks and 27 hens, was reduced early in the season by the loss of 4 hens, and nearly all of the 923 eggs collected were laid by the 23 hens remaining, making the average of eggs per hen about 50 per cent. higher than last year.

The increase was made by the two-year-old birds. they laying in some pens over 50 eggs each. As noted last year, the yield of some pens was so far below the average as to indicate the birds in them were undesirable for breeders; consequently, when the stock was bunched for wintering the poor layers were discarded. The three-year-old birds showed a decreasing productiveness and were also discarded.

It so happened that one of the new cocks obtained of H. G. Foster, of Ashby, was put into the pen that contained the best layers, and as the chicks from this lot proved stronger than any of the rest, the new brood stock was largely reserved from the product of this pen. From an early lot of 17 chicks, 15 were reared to maturity and are now in the pens.

The large increase in the number of eggs was not accompanied by any improvement in their vitality. The weakness that caused such a heavy loss of eggs last year was felt more severely this year, and earlier in the season, the first lot being the poorest when a year ago it was the best. Toward the end of the season there was a steady improvement, and the last lots hatched fairly well. From 923 eggs set, 299 chicks were hatched. Most of the eggs that failed to hatch were fertile, and very many contained live chicks when due to hatch, but in most cases the chicks were too feeble to live when helped from the shell, though some were saved in that way.

All observations indicate a lack of vitality in the brood stock which was transmitted to the embryos, and the conclusion that was reached last year in regard to avoiding it, namely, to increase the vigor of the breeders, should be adhered to. The obtainment of some new cocks this year proved beneficial, but the principal benefit, of course, is to be looked for next season.

This year's experience indicates unmistakably that it is increasingly important to build improved pens. The breeding pens we now have, while adapted to the purpose they were intended for, are quite unsuitable for wintering birds, being bleak and icy in cold weather and slushy and foul in the thawing weather. A pen suitable for wintering pheasants should be several times the area of those we now have for breeding pens. The wintering pens can be built on the adjoining hillside, which slopes to the southeast and is thickly covered with scrubby brush. They would then furnish warm, sunny and dry quarters, where the birds would have ample room for exercise, and likewise incentive to scratch in the brush and litter, with an assured beneficial effect. A small pen, extemporized of boards and old poultry netting, was located on this hillside ground and used for con-

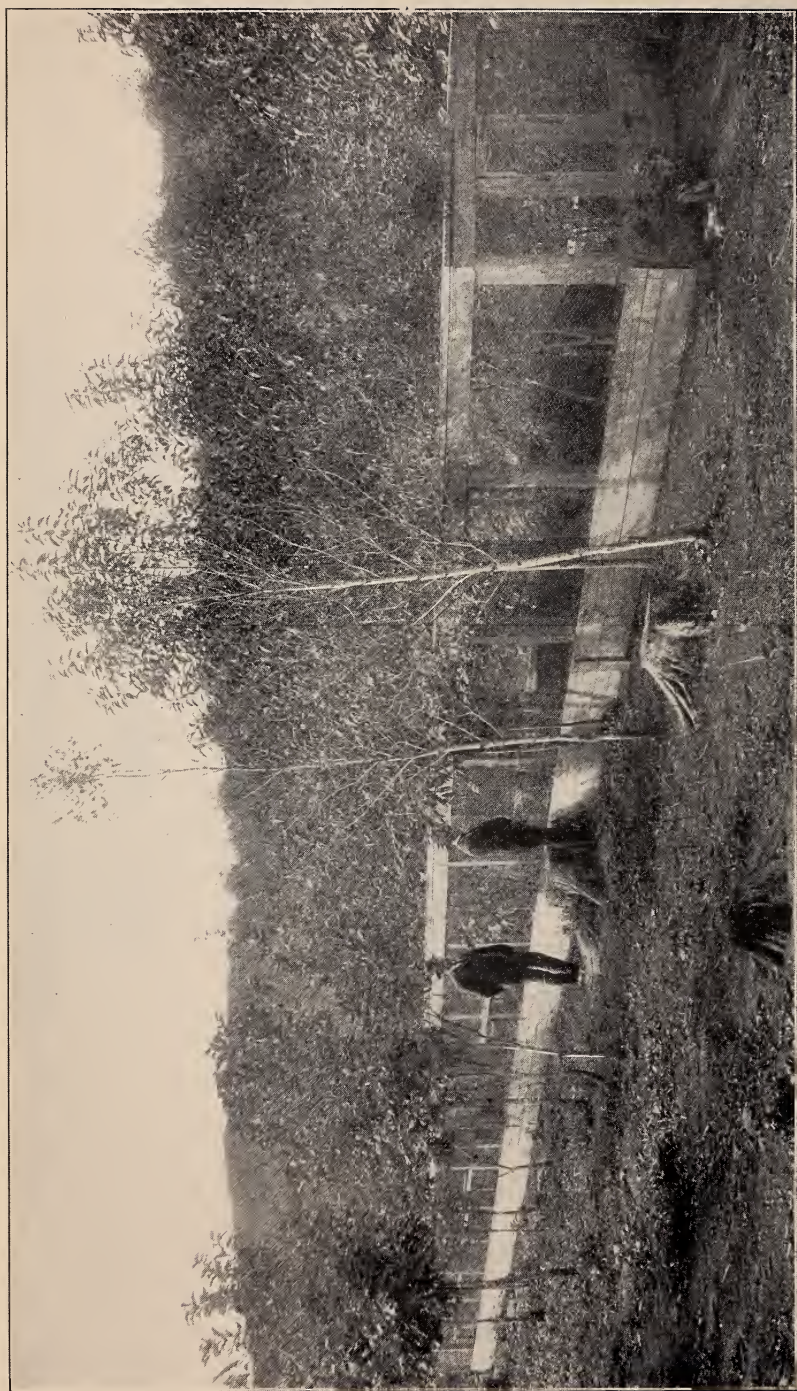


Plate X.

PHEASANT COOPS AT SUTTON.

fining the birds received for breeders, and they have reached a size and condition never attained by any pheasants in the old pens.

Although many of the chicks were weak when first hatched, they rapidly developed strength, and the loss by death during the younger stages was slight, with the exception that, during a period of raw, wet weather, more than 40 died. One hundred chicks in all succumbed before they were a month old, and 81 were lost at ages ranging from a month upward. The number successfully reared and distributed was 118.

The loss of young chicks was not unexpected or discouraging, for it was less than usual with pheasants; but the mortality of the older chicks seemed unnecessarily heavy; it was greater than the previous year, and was due to different causes.

Extreme care was taken in penning the birds so that they would not suffer from confinement, and very few died in the pens; but in avoiding overcrowding, many of the later lots were kept outside and exposed to their enemies much too long. Twenty were lost from one lot, and enough disappeared from other lots to bring the total loss to over 60. Various accidents, including drowning, which took 10 young birds, brought the total to 81.

The heaviest unaccountable loss last year occurred among the very young birds, and was perhaps rightly attributed to crows. By a persistent warfare on them the crows were kept at a distance this year, with a resultant immunity from destruction of young pheasants. There is evidence that cats, foxes, owls and hawks are responsible for the destruction of the birds too large and active for crows to carry off that disappeared this year, although little proof of this could be obtained.

I renew my recommendation, made last year, that suitable pens be provided for confining the birds when quite young, so as to avoid the loss above referred to. This seems increasingly necessary, for the causes which produce loss are multiplying quite as fast as the increase of birds. The cost of pens sufficient to confine all the pheasants raised this year would not have been over one-half of the value of the birds lost. The pens recommended should be low, movable, inexpensive affairs, of sufficient stability to hold the birds until the season for distribution, but not for wintering.

The chicks should still be permitted to run free for several weeks after birth, for it is not necessary to confine them until they begin to stray from the hens.

The difficulty heretofore experienced in getting setters to incubate the pheasant eggs was obviated by the acquisition of a sufficient

flock of hens; besides avoiding the waste of time in securing setters, as heretofore, the hens we used have proved more tractable on the nests and with the chicks.

An important observation, which may aid materially in determining what kind of hens are best to use, was the great difference noted in the results obtained in hatching. Old hens, or those of light weight or feeble condition, invariably failed. The highest success was secured with young and vigorous hens, notably some white Wyandotte pullets. The bantams did not succeed as well as the large hens in hatching, but did far better in rearing their chicks.

The hens have paid for themselves and nearly all of their food from the time of acquisition, and for another year they can be expected to pay for a large part of the pheasant food in addition. Although they seemed unusually disposed to breed, the number available for setting was barely sufficient to meet requirements, and in a season of normal hatching would have been insufficient.

The cost of rearing the pheasants has been limited virtually to the cost of their food, or less than \$60, which includes the food for the bantams and all the hens. No improvements on the pheasant pens were made that caused any expense, and only \$3.30 was expended on the hen yards.

The results show a decided advance over last year, from the same number of breeders. An increased output was secured, and the birds were liberated in better condition. The good results with the young chicks seem due in a large measure to the food, which was substantially the same as that used last year,—maggots, and custard thickened with suitable substances. It produced a rapid, healthy growth of the chicks, and is certain to be fully as effective with much larger flocks; for, with the unrestricted range here, there will be no evil effect of crowding that will tend to produce a different result.

There is ample reason for expecting a satisfactory increase of pheasants from the present brood stock, for all that stands in the way is the recent difficulty in hatching and the loss of birds in the more advanced stages of growth, obstacles that are owing to removable causes and apparently not difficult to overcome.

Respectfully,

ARTHUR MERRILL.

Experiments Elsewhere. — At the close of the Sportsman's Show in early March, Messrs. Paul Butler, of Lowell, and Charles W. Dimick, of Cambridge, evinced a desire to undertake, under the auspices of the commission, some experiments in the acclimatization of various species of foreign game birds.

that had been on exhibition, and also to see what could be accomplished in breeding the partridge or ruffed grouse in semi-domesticity.

The foreign birds used in these experiments embraced representatives of the same species received at Winchester, while the ruffed grouse were part of the lot that had been on exhibition at the Sportsman's Show.

These gentlemen, who are deputies of this commission, are both deeply interested in everything that tends to develop a greater knowledge of game species, or which may lead to the introduction or increase of desirable forms. In addition to this they had special facilities for conducting experiments, without expense to the State, and were willing to incur considerable personal outlay in the effort to secure desired results, or at least to determine what could be accomplished.

Mr. Butler has a large estate near Lowell, and on this a considerable area was devoted to ruffed grouse. This lot, which contained bushes, trees and other features such as are commonly found in covers frequented by the partridge, was enclosed and also covered with netting to prevent the escape of the birds. The plan was to leave the birds as undisturbed as possible, subject to no other intrusion than that incident to feeding them. This, it was hoped, would result in the pairing of the partridge, and their natural increase in confinement. If this could be achieved, attempts to advance the experiments in other directions could be made, so that step by step the limit of accomplishment could be determined, at least approximately.

Just what result might have been secured except for an untoward event may, perhaps, not be positively stated at this time, although there is reason to believe that one brood of ruffed grouse, if no more, might have been raised. One of the workmen on Mr. Butler's estate, we are informed, while making some repairs to a bridge over a small stream, found a nest of partridge eggs under the bridge. To what extent the nest or eggs were disturbed we are not informed, but, however limited this may have been, the mother bird forsook her nest; consequently what promised to become a success proved a disappointment. There was, nevertheless, sufficient encourage-

ment in this to justify a continuance of effort to breed partridge under the conditions indicated.

Mr. Dinick has nothing to report of a satisfactory nature, although he is hopeful that another year may bring better results.

Nothing was accomplished with the foreign birds, we are informed, so far as breeding them is concerned, and the question of breeding these species in confinement, after they have been brought across the Atlantic, seems to be an unsolved problem at this time. If it can be done successfully these gentlemen, with the facilities at their command, should be able to accomplish the task, which is a work of no small moment when we have in mind what it may mean to the effort now being made to stock our covers with desirable species of game birds. But in this as in many other things success is attainable, maybe, only after repeated attempts and repeated failures, and knowledge can be gained only by experience.

Distribution of Game Birds and Animals. — During the year 350 pheasants have been liberated in various sections of the State, in compliance with the requests of applicants. In the appendix will be found a list of the applicants to whom pheasants were sent and the points where the birds were liberated. The number of pheasants distributed this year is slightly less than was sent out in 1901, due to the reservation of a number for wintering. As has been shown, the number raised exceeds that of any other year.

The Belgian hares distributed numbered 193. The points of distribution and the persons to whom the hares were sent are shown in the appendix.

The applications for these birds and animals have been far beyond any previous record, and far too numerous to comply with all of them, especially in view of the fact that many which remained on file from last year deserved consideration. The interest shown in the distribution of pheasants and hares is a most gratifying evidence of a growing public desire to have the State covers properly stocked, — a desire that the commission is anxious to gratify to as full an extent as possible. It is doing more now in that direction than ever before, and, as heretofore, will exert itself to the utmost to comply with all de-

mands, which may be possible if circumstances should prove favorable.

The birds and animals have been distributed by the deputies often in connection with the distribution of fish, so that the work could be accomplished with greater economy.

Concerning Introduction of New Species. — Reference is made to the chapter on breeding game birds at Winchester and “Experiments elsewhere” for information concerning attempts that have been made to acclimatize foreign species of birds. These were imported in considerable numbers by the management of the Sportsman’s Show, and to that extent the experiments have been favored.

An effort was made by the management to procure specimens of the Capercailzie (*Tetrus urogallus*) and the black game (*T. tetrix*) from northern Europe, but without result, notwithstanding European agents were under instructions to procure specimens of these species for many months before the opening of the show. This seems to indicate a notable difficulty in securing either of these birds for this country.

An effort was made by the commission early in the year to secure a consignment of mountain quail (*Oreortyx pictus plumiferus* Gould) from Oregon. Arrangements were concluded with Mr. F. L. Reis, of Albany, Ore., to ship one dozen specimens of this species, it being understood that he had the birds in captivity and that they were semi-domesticated. The shipment was accordingly made, but, because the birds were not properly boxed for so long a journey, and also because they were probably wild birds, which had been trapped only a brief time before they were shipped, all were dead when received and most of them had died before reaching Chicago.

There is every probability that birds of this species, which have been kept some time in confinement and thereby become somewhat accustomed to the presence of man, can be safely shipped across the continent by one expert in such matters; but care and expertness can count for little unless permission can be obtained for the exportation of the birds out of the State where they are procurable. On the other hand, the granting of a permit to the inexperienced in such matters can serve no useful purpose. And right here it may be stated that the most

expert hunter or trapper — one who may be perfectly familiar with the haunts and habits of the mountain quail — may be, and probably will be, totally deficient in knowledge required to successfully send live wild birds on a long journey.

While the result of this attempt to acquire the mountain quail for breeding purposes is deeply regretted, the obtainment of living birds of this species is not conceded to be impossible, and better fortune may attend future attempts.

EXHIBIT AT SPORTSMAN'S SHOW, ETC.

Authorization by the Governor. — Previous to the present year this commission has never undertaken to make any exhibit illustrative of its work and functions. Nor had it previously possessed the material for doing this. The importance of participating in a Sportsman's Show held in Boston, to the limited extent made possible by the small collection gathered in recent years, was urged upon the commission, and was too apparent to be successfully refuted.

There was, however, no specific provision for this in the appropriation granted by the Legislature and also no proper legalization. Authorization was therefore sought of His Excellency the Governor, who, appreciating the desirability of having the work of the Fish and Game Commission represented at the show, where the commissions of other States would probably exhibit, promptly granted the authority sought.

Scope and Character of the Exhibit. — The limitations of this first attempt at participation in an exhibition were necessarily much restricted, since, for many reasons, it was desirable that the effort should be only a modest one, which should involve the minimum of expenditure. It was therefore decided that the exhibit should be restricted to such material as might be chiefly interesting to sportsmen, fish culturists and naturalists.

The primary object was to show, by living and mounted specimens, lithographs or photographs, the fish, birds and animals propagated by the commission for stocking State waters and covers; also, the plants for carrying on this work, such as fish hatcheries, brood and rearing ponds, pheasant coops, incubators, boxes for breeding and rearing Belgian hares, etc. In addition, there were specimens of fish and game birds that

are protected by State laws or that it may be desirable to introduce; also fish-eating birds and a few illustrations of the sea and coast fisheries.

Besides all this, the commission assumed the responsibility of the exhibit of living partridge or ruffed grouse, although the expense of collecting the birds and caring for them was borne by the management of the exhibition.

The live fish exhibit was composed of about 300 specimens in four large tanks. One of these aquariums contained four-year-old brook and rainbow trout; another two-year-old brook trout and three-year-old brown trout; the third had three-year-old landlocked salmon, and in the fourth there were 200 brook and rainbow trout yearlings.

To supplement these living specimens there were preserved collections in bottles of trout and salmon fry, trout fingerlings (including monstrosities), pike perch fry, trout and salmon eggs in various stages of development, landlocked smelt eggs; and framed colored lithographs of the following species of fish: brook trout, rainbow trout, brown trout, lake trout, Atlantic salmon, striped bass, pike perch, white fish, small-mouthed black bass, white bass, rock bass, calico bass, white perch, yellow perch, shad and carp.

The fish cultural work of the commission was further illustrated by large photographs (15 by 20 inches) of the following subjects: fish hatchery, Adams, Mass.; fish hatchery, Hadley, Mass.; fish ponds, Hadley; tub system, Hadley; fish hatchery, Sutton, Mass.; fish pond, Sutton; tub system, Sutton; superintendent's residence, Sutton, and the fish hatchery at Winchester, Mass.

Twelve living Mongolian pheasants were exhibited. These were installed in an enclosure on the southeast side of the building, inside of wire netting, with an abundance of small evergreen trees so arranged that the birds were partially sheltered and less shy than they otherwise would have been. They did well.

To further demonstrate the work of the commission in the propagation of game birds and animals there were exhibited the following mounted specimens: a pair (cock and hen) of Mongolian pheasants, an English cock pheasant, and a cock

partridge. Also large photographs (15 by 20 inches) of Mongolian pheasants, the pheasant coops at Winchester, pheasant coops and rabbitry at Winchester, rabbit pen and box, Winchester, and pheasantry at Sutton.

The following mounted specimens were shown in addition to the above: gannet or solan goose (*Sula bassanea*); male mallard duck (*Anas boschas*); prairie chicken; pair (male and female) of black cock (*Tetrao tetrix*), and the head of a buck deer killed in Massachusetts.*

The exhibit further included small photographs of partridge nests, with the mother bird sitting on the eggs in one of them; also photographs of the following subjects framed together in a group: (1) Lifting a pound net at Cape Cod; (2) Landing the catch; (3) Landing clams at T wharf; (4) Winter at T wharf.

A model of a stick lobster pot completed the collection.

By an arrangement with the Massachusetts Fish and Game Protective Association the erection of a booth resembling a rude log cabin was conjointly undertaken by the commission and the association, each to pay half the expense of construction and to share equally in the use of the structure for installation of exhibits. The interior was divided into two parts by a crosswise partition running through the middle. This "camp" was built of slabs with the bark on, as a rule, and had the projecting eaves characteristic of such structures. On top was a long sign, bearing on one end the title of the commission and on the other that of the association.

This provision for installation, and especially the arrangement for a division of the expense, enabled the commission to make a creditable display with a remarkably small expenditure.

Aside from the living fish and birds, the entire collection enumerated above was installed in the commission's section of the "camp." Each object was provided with a printed descriptive label.

During the progress of the exhibition, which opened on February 22, Commissioner Delano looked after the exhibit of the commission, giving his personal attention to the care of

* This animal was illegally killed in the fall of 1900, and a fine of \$100 was paid for the violation of law.

the living fish and birds as well as to the other objects displayed.

For a modest first attempt, the exhibit of the commission received much favorable comment; enough to justify the effort put forth to illustrate to the public what the State is doing to conserve and increase the wild life in our interior waters and woods.

The exhibit of wild partridge had specially interesting features. This was the first occasion, so far as we are informed, when it has been found practicable to keep on public exhibition, in a building through which a surging crowd was continuously passing, living specimens of this bird. Indeed, it had been deemed impossible of accomplishment by many. That it was successfully done is due to the zeal, patience and good judgment of Mr. Dimick, as well as to the assistance given him by the commission in procuring the birds, etc. The attempt would unquestionably have been a failure if the birds had been exhibited immediately after they were captured, for their well-known shyness and intense aversion to the presence of man would have caused their self-destruction in the effort to escape. Foreseeing this, Mr. Dimick provided for the obtainment of the birds weeks in advance of the opening of the show. As fast as secured they were taken to quarters specially prepared for them. Gradually they were accustomed to the presence of man; then to gentle handling. Anything that could startle them or cause them to lose any of the confidence they had gained was carefully avoided.

The following description of the method of treatment, published in "Forest and Stream" of March 8, 1902, gives many details which are interesting in this connection:—

Now the problem was begun. Mr. Dimick and his son, a boy of eighteen, who loves birds and animals as well as his father, made a great study of the subject. They put the birds in an enclosure padded with cloth of a dun or dead-leaf color. The windows, large and capable of great ventilation, were covered with mosquito netting that the birds could fly against and not cling to or injure themselves. The floor was of earth, and covered with leaves and moss. Green boughs were supplied in plenty, with plenty of hiding places. But the greatest difficulty was yet to overcome. They had already lost a

number of birds, evidently through starvation induced by fright. What was to be done? The poor partridges would only crowd into a corner, and refused to eat. Mr. Dimick reasoned that they were actually made sick by fright. If a man were sick from fear something must be done to quiet his fear and tempt his appetite, and it must be a natural, most tempting and stimulating food. What must be obtained for the frightened partridges? They studied further when almost everything had failed. At last they thought of ant eggs or larvæ. These they could obtain from ant hills and decayed wood. They were tried. The partridges eyed them. Soon one "grabbed for them." The others followed. From that forward the birds began to mend, began to eat; and the thing was done! But their wildness was improved but a little bit. Here was another knotty problem: How could the wildness, a part of the nature of the ruffed grouse, be overcome? Mr. Dimick made up his mind that it was best to enter the enclosure where the birds were with as little motion as possible. At first he would be several minutes in moving a few feet toward the birds, — moving very slowly, with hands down and without motion of his head. If the birds showed extreme fear he stopped, remaining motionless till they were more quiet. For a long time he would not raise his arm, or even move his hand, if he thought it increased the alarm of the partridges huddled together under the brush in an extreme corner of the enclosure. Gradually they seemed to lose their fear. Now he enters their enclosure and they do not manifest the least alarm.

The opening night of the Sportsman's Show they were greatly frightened. They were in a new enclosure, with hundreds of eyes staring at them; moving people in all sorts of dress. Mr. Dimick noticed that it seemed to calm their fears somewhat when he or his son came along with others. The next morning early he came into the Mechanics' Building, and the first place he visited was the partridge compartment. There they were, huddled in the corner the same as the night before. They had not moved from the position first taken. He entered the compartment, crawling flat on the floor, so as not to frighten them more by his standing height. Very carefully he approached the crouching birds. He worked his hands under one, at the same time making a soothing whistle or chirp which he and his son had learned that the grouse make to one another. The birds seemed to begin to lose their fears. Cautiously he pushed one bird forward toward the other end of the enclosure; the others followed. Others were moved still further ahead, and within a half hour Mr. Dimick had the whole brood of 23 partridges

moving about the enclosure. Since that time they seem to enjoy running about in and out of the little hiding places made for their comfort. They show little or no fear, jump or skip over the little logs of wood and artificial stones with all the beautiful dexterity and grace of motion that the hunter loves so well.

As a matter of fact the partridge seemed to display no more (if so much) fear than the pheasants which had been reared in domesticity. Consequently this particular phase of the Sportsman's Show was as successful as it was novel.

The opportunity to observe the habits of the partridge thus held in confinement led to the determination of some interesting facts which before were unknown or in doubt. We will not attempt to discuss these in detail, but will only mention the fact that previous to this exhibit a division of opinion seemed to exist as to whether the partridge drank water or not. The negative opinion was the prevailing one, apparently, even among the keenest observers who were familiar with the species. By actual observation it was fully and finally determined that the partridge drinks as readily as domestic fowl.

Request to participate in Agricultural Fair. — Mr. Henry A. Mower, of Worcester, desired the commission to make a live-fish exhibit at the Worcester Agricultural Fair, September 1 and 2. It was not, however, deemed practicable to undertake this for various reasons, prominent among which was the large amount of work to be done in other directions that demanded the personal attention of the commissioners.

ENFORCEMENT OF LAW.

Financial Resources. — No specific appropriation was made for the enforcement of law. Nor could it well be made, for the reason that in the same day a deputy may actively engage in enforcing the law and in the distribution of fish, birds or animals. He may also engage in other necessary work for the commission, from time to time, although the chief duty of the deputies, and the one which occupies a very large part of their time, is the protection of fish and game, through the enforcement of laws enacted for that purpose.

The amount estimated for this work during the present year

was \$10,200, and about this sum will be expended, although, for the reasons named, it is not practicable to specify the outlays with exactness.

Force employed. — As heretofore, the force employed has consisted of (1) salaried deputies serving throughout the year and devoting their entire time to the work of the commission; (2) special deputies receiving pay for short and varying terms of service, as demanded by the exigencies of the work or made possible by the funds available, who at other times were unsalaried officials; (3) special deputies who receive very little pay from the State, deriving their income chiefly from clubs or because of employment as town or county officials; (4) special deputies paid small annual salaries for care of (a) State pond and (b) fishway; (5) deputies paid wholly by clubs, so far as they receive pay for enforcing fish and game laws, but unsalaried by the State; and (6) unpaid deputies, serving without pay from any source, but entitled by law to half of any fines resulting from convictions.

At the beginning of the year there were 6 permanent deputies and 2 special deputies on the rolls, 1 of the latter being in charge of the Lawrence fishway and the other having the care and supervision of Mill Pond at Yarmouth, reserved by the State for fish-breeding purposes. In the spring 3 additional regular deputies were added to the list. At various times 13 special deputies were appointed for different periods, but, with few exceptions, only for the open-game season or from a few weeks before that until its close. The volunteer deputies who were not on salary at any time numbered 145.

In all cases much care was exercised in the appointment of these officials, and as a rule there was reason for satisfaction. Information came to the commission, however, which warranted the revocation of the appointments of 3 deputies of the unpaid class. This action was unhesitatingly taken in pursuance of the policy of the commission never to continue in official position one whose moral character or respect for law is shown to be deficient.

*System adopted.** — The system adopted for the enforcement

* It is a matter of interest that the system adopted by this State for the enforcement of fish and game laws has apparently attracted attention in other sections of

of the fish and game laws was substantially the same this year as during the two previous years, varied chiefly to the extent made possible by (a) additional experience gained by the paid deputies; (b) by a moderate increase in the salaried force; (c) by a wider application of the principle of co-operation between salaried and unpaid deputies or local officials; (d) because of the wider recognition by citizens of the importance of reporting violations of law of which they are cognizant; (e) because of the employment of a power-driven boat for enforcing laws along the coast; and (f) because of the availability of sufficient funds to keep the salaried men actively on the move to the highest degree practicable.

The distribution of printed information relating to the fish and game laws has been largely carried on, this being deemed one of the most efficient means of securing compliance with the statutes. More than 11,000 documents of various kinds have been distributed, 5,000 of these containing the complete fish and game laws and others being abstracts or special laws.*

The demand for this class of information is remarkable, and plainly indicates the necessity for increasing the output.

Beside the documents referred to copies of "Laws relating to Inland Fisheries of Massachusetts, 1623-1886" have been distributed by the commission, chiefly for town libraries or other places where they may be easily available for reference.

With its usual courtesy and desire to furnish information of public interest, the press has given wide publicity to abstracts of the fish and game laws, or to special laws, and has invited attention to regulations relating to pond fishing, the opening or closing of the fishing or game seasons, and has pointed out what cannot be legally done by sportsmen. In this and other ways the press has rendered invaluable aid in diffusing information, and thus securing a better respect for the fish and game laws. To this extent much good has undoubtedly been accom-

this country, as evidenced by the fact that this commission has been appealed to for statements and facts bearing on the matter. This is significant of the spread of public interest in the proper protection of fish and game, and especially of the wide recognition of the necessity for well-directed and efficient enforcement of the laws.

* A very useful work has been done by the Rod and Gun Club of Boston in printing and posting numbers of abstracts of fish and game laws in the Italian language.

plished, for many who otherwise might have transgressed the laws unwittingly have unquestionably been kept from doing so by being thus informed of the penalty.

Almost without exception those who have violated the fish and game laws have done so with full knowledge of the penalty. Doubtless most of them have been old offenders, or those who are disregarding of law unless compelled to be otherwise through fear of arrest and conviction. Anything else is an exception. It is probable there always will be transgressions of the fish and game laws, as there are violations of other laws, and it is certain that it will not do to relax effort to compel a respect for them, while it is still the serious purpose of the State to protect fish and game. For, although it may safely be claimed that never before have the fish and game laws been so vigorously and successfully enforced in this State, and never has there been such a general observance of these statutes, the large number of arrests and convictions secured by the commission is sufficient evidence of the necessity still existing for other action than moral suasion. At the same time it will not be denied that reasonable consideration has been exercised in some cases, where the offenders have been young boys,* or other conditions justified the action taken.

The illegal capture and sale of lobsters, and Sunday hunting,

* The following extract from the North Adams "Transcript" of Jan. 20, 1902, gives details of an instance of this kind: "As Game Warden Nichols was passing through Braytonville yesterday afternoon his attention was attracted to a number of small boys one of whom had a rifle. They were apparently on the trail. He watched them for a few minutes and soon saw that the object of their chase was one of the Mongolian pheasants he had liberated last fall. It seems that a pair of the birds have settled near that section of the city and have been seen several times this winter between Braytonville and Greylock. The game warden explained to the boys some of the mysteries of the game laws, and advised them hereafter to let strange birds and beasts continue on their way unmolested."

In his annual report Deputy Thomas L. Burney, of Lynn, makes the following statement of the discretionary methods he adopted: "In the enforcement of the fish and game laws, where I could secure the desired result without an arrest I did so; believing that a novice was entitled to some consideration, I found that instruction in several instances brought better results than an arrest."

Deputy E. C. Hall, of Buckland, reports the following, which is a notable instance in point where an unpaid official has shown unselfishness while trying to secure observance of the law: "I found two young fellows July 4 who worked in a shop in Berkshire County. They each had about 40 to 50 short trout, which they showed me with pride. We are near the line here and these young fellows said, with apparent truth, that they thought they were still in Berkshire County. I let them go on promise of more care in the future. This Berkshire law is a nuisance."

have been, perhaps, the two most common violations of law we have had to deal with, although there have been various other forms of transgression, such as illegal fishing, killing song and insectivorous birds, ferreting, selling partridge, snaring, etc.

No part of the law-enforcing work is so trying and unsatisfactory as that for the protection of the lobster. Not only are many difficulties met with in the attempt to patrol a coast line, hundreds of miles in length, with four or five men at the most, except for a short period, but there is an unwise public indifference to the protection of the lobster, amounting at times to positive opposition, while the results of court trials are too frequently far from encouraging. Nevertheless, everything practicable in the enforcement of the lobster laws has been done. Many cases have been taken before the courts, convictions have been secured in a number of instances, and hundreds of illegal lobsters have been seized and thrown into the sea. Keen pursuit has caused many others to be thrown overboard, and this has had an effect never before equalled. The power-driven boat employed covered the coast as thoroughly as practicable from the south shore to Cape Ann, but the season of service for this was too short to accomplish as much as otherwise might have been possible. At the same time, it must be conceded that this naphtha dory, to which reference is made in the chapter on the lobster fishery, was the most effective means yet utilized by the commission for enforcing the lobster laws.

Mr. A. B. Cleverly, of Hull, Mass., writing under date of September 11, says:—

I was pleased to see the boat you have on for the protection of the lobsters. It has saved thousands of lobsters for the fishermen. Hope she will be here next year by the first of April, if possible. She has driven a great many short-lobster men out of business.

The abundance of game birds and animals this year proved a great temptation to many to violate the "close season" Sunday law. It is probably not convenient to many to get time to hunt in the open season, at least without some sacrifice of pay, consequently they take the risk of hunting on Sunday, although perfectly aware of the law and the penalty for violating

it. The expectation, of course, is to escape capture, but the tabulated statement of arrests and convictions in the appendix will show that to some this was a false hope; for many men have been apprehended for Sunday hunting. It has not been uncommon for as many as six to ten persons to be arrested on a single Sunday; six were taken by two deputies on a Sunday at one place.

This vigorous work had its effect, and before the close of the hunting season this particular violation was so far repressed that the universal testimony was to the effect that there was less Sunday hunting than was ever known before.

It is probable that there was no more shooting of song and insectivorous birds this year than common, but there were many more arrests and convictions than heretofore, due chiefly to a better organization of the deputies and increased facilities for gathering information. This particular transgression is participated in almost wholly by foreigners, among whom Italians are so conspicuous that they are popularly supposed to be the only offenders. The greater part of this illegal shooting is done within twenty miles of Boston, although more or less violations occur elsewhere, near large towns or where parties of foreigners are laboring on railroads or other public works. The arrests made had a very salutary effect, and there is reason to believe this will be felt in the future.

More has been done to suppress the evil of ferreting than for a long time. In some of these cases, too, good detective skill was evinced in working up sufficient evidence to convict, without the deputies having witnessed the act of using ferrets.

There can be no question of the moral effect of convictions thus secured, which have shown to parties disposed to use ferrets that they are by no means safe from the grip of the law, because they may not be caught in the act of transgression by the agents of the commission.

From time to time rumor and suspicion asserted that parties were engaged in the illegal sale of partridge. In the absence of a search law, and not being able to secure a search warrant, the detection of offences of this kind was exceedingly difficult, for in all cases of such violation the parties have undoubtedly been old offenders, skilled in the various tricks usually resorted

to by such people to evade the penalty the law imposes for transgressions of this character. Carefully following out every clew or complaint, it has generally been found that either the latter was based on ill-founded rumor or suspicion, or that no evidence of any kind was obtainable. As a result, however, of the exercise of a high order of detective skill, combined with patience and determination, two cases of offering partridge for sale were brought into court. In each of these cases the evidence was so conclusive that defence was abandoned, the culprit pleading guilty. In one case the court imposed the maximum sentence, \$20 for each bird, or \$100 for the 5 offered for sale. In the other case 13 partridge were offered for sale. The party arrested was fined \$20 for 1 bird and the case was continued for sentence on the other 12, with an admonition from the court that the full sentence would be imposed if the person was again found guilty of violating a fish or game law.

Although snaring had been pretty well stamped out during the past two years a few old hands at this illegal practice ventured to engage in it this year, probably tempted by the unusual number of partridge and a possible opportunity for the disposal of them. Several of these offenders were caught red-handed under circumstances which reflected high credit on those making the arrests, who, in each case, exhibited zeal, patience and a disposition to endure uncomplainingly much exposure and hardship. It requires all of these to impel one to lie still and watch, for days or nights at a time, for a snarer to come to his traps, and this, too, when the weather is inclement enough to test the endurance of the strongest constitution. For some reasons it is regrettable that lack of time and space makes it impracticable to give details of any of these cases.

As heretofore, the work of the salaried deputies has been directed from the office, so that the organization would be more effective, and, at the same time, a better system of co-operation between the paid and unpaid deputies could be established. While this vastly increases the labor in the office, the results secured are ample recompense for the effort, for in no other way can effectiveness be secured.

The regular organized force has been kept remarkably active, continuously going from place to place to enforce the law or to perform other duties, such as the distribution of fish, birds and animals. Some of these deputies have visited anywhere from fifty to a hundred and twenty towns, and one claims to have travelled more than 9,000 miles during the year. When consideration is given to this and to the additional fact that there have been many occasions when the same deputies have had several cases in court in one week, or even in one day, the activity and efficiency of this little force will be plainly apparent. Nor should mention be omitted of the economy with which a great amount of work has been accomplished.

The unpaid deputies constitute what may be termed an irregular force. While it is necessarily less aggressive than the regular organization of salaried officials, for the men generally must give their attention chiefly to the vocations they are pursuing, nevertheless the moral influence of this force is most helpful, while the heartiness with which these unsalaried officials have co-operated with the paid men has been very gratifying. It is from this force that the special deputies are appointed, and thus men receive a preliminary training that may subsequently make them experts in this work. Mention should be made in this connection that one of these gentlemen, who is a member of the bar, has taken an active part in the prosecution of cases in the courts this year without being paid for his services by the State, an evidence of a commendable desire to assist in the effort to secure a greater respect for and observance of the fish and game laws. Inasmuch as this assistance has been given voluntarily, and without the least suggestion from the commission, all the more satisfaction is felt with the public spirit that prompted it. In another instance a sportsman, who is likewise a lawyer, freely offered his services in the prosecution of an important case.

Result.—The result of the effort to enforce the laws appears, primarily, in the increase of fish and game in the Commonwealth; it is also shown in the tabulated returns of the arrests and convictions published in the appendix. This shows that 157 arrests were made and 138 persons were convicted; the fines reached an aggregate of \$1,772. Other details, which

may be of interest to those who recognize in the enforcement of law a potent means for preserving from extermination inland fish and game, will be found in the table.

The following brief extracts from the press and letters or reports of deputies, which are only a few out of many, will also contribute to a better understanding of the result.

The Ware River "News" of July 31, 1902, published the following:—

The Fish and Game Commission have done a great work in this State, and it is possible now to hunt and fish in season with an assured degree of good luck. All forms of illegal taking have been reduced to a minimum through the vigilant efforts of the commission and its efficient deputies all over the State, and there has been a great change for the better in this vicinity the past year or two.

A correspondent of the "Evening Herald" of North Adams, in a brief item published in the issue of Oct. 28, 1902, says:—

With such a wide-awake game warden as we have in this section, supplemented by an unusually competent police force, I'd as soon try to break into a bank as to try and hunt Sundays anywhere in this direction. A man would have better chances at the bank.

The following excerpts are from a long article in the Boston "Globe" of Oct. 2, 1902:—

Conditions for sportsmen in Massachusetts are improving all the time. Partridge and quail are increasing rapidly, a marked improvement in brush shooting being noted by sportsmen since the enactment of laws prohibiting the sale of certain game birds in the market.

This market law has given the partridges an opportunity to multiply which they never before enjoyed, though keen scrutiny is necessary each fall to prevent the sale of these splendid game birds under the guise of Canada grouse, or prairie chickens.

The pot hunter, who employed snares and guns to supply his patrons with game birds, was the one hard hit by the recent game laws, and so unrelenting has been the warfare waged against him by the wardens that his occupation may be said to be gone.

An insight of the good accomplished by protection may be had by a stroll in the Middlesex Fells. This bit of wild park land, several thousand acres in extent, is not more than 10 miles from

the city, but it is a veritable home of the ruffed grouse. They flush on every hand when visitors take to the woods for a stroll in the Fells, and on sunny days they come out to the roadways to dust themselves in the sand just as barn-yard fowl are wont to do.

Deputy A. L. Pratt of Belchertown, under the head of "Remarks" in his report for the week ending October 5, made the following statement:—

I also find that a large majority of people are heartily in sympathy with the work of the Fish and Game Commissioners, and seem willing to assist in any way in the enforcement of the fish and game laws.

Deputy A. D. Putnam, in a letter written October 10, states that he had conversation with a number of farmers in the vicinity of Templeton concerning the enforcement of the game laws, and that they were all specially urgent that the law against Sunday hunting should be enforced with the utmost rigor.

The feeling concerning the enforcement of the Sunday hunting law, referred to by Mr. Putnam, was emphasized at a meeting of the Massachusetts State Grange last December, when, according to the Pittsfield "Evening Journal" of Dec. 24, 1901, they recommended the "rigid enforcement of the Sunday law in reference to fishing and hunting." But this has been still more forcibly referred to editorially in the North Adams "Evening Herald" of Oct. 16, 1902:—

The Fish and Game Commissioners are doing exactly right by enforcing the law against Sunday gunning. The hackneyed cry that Sunday is the only time that a poor man has to go shooting applies just as well to the ordinary person who is not quite so poor. In this workaday age none but the idle rich, who are of no consequence, have much time to go gunning during week days, but so far as time is concerned, it is about as valuable to one as to another.

In a certain way there is no more harm in going shooting than fishing Sunday, and both are against the law. But the person who goes fishing does not disturb his neighbors, or any one else. On the other hand, the gunner fills the wood with his gun reports, and is annoying to those who do not believe that Sunday should be observed in that way.

Then the game itself deserves one day a week free from molesta-

tion. There is little enough of it when chased by gunners six days in the week. If the day when every one is at leisure be given to shooting it will not be long before there is no game to shoot.

Mr. Lyman E. Ruberg of the town of Florida, under the head of "Remarks" in his report for the week ending November 2, says: —

North Adams people must have come to the conclusion that Sunday is a good day to stay at home as I have never seen a quieter Sunday there.

Mr. Ruberg was one of a party of four deputies who on Sunday, November 2, went through the sections ordinarily frequented by hunters in Williamstown, South Williamstown, Hancock, Blackinton and Clarksburg without hearing any shooting.

Deputy William Leipple of Greenfield, writing on November 3, in reference to his work on the previous day, while looking for violations of the Sunday hunting law in Montague and vicinity, makes the following statement: —

I drove through the woods all day Sunday, and heard no shooting, and I think that the Sunday law breakers have stopped their Sunday shooting in this vicinity.

The following extract from the Worcester "Telegram" of Sept. 16, 1902, indicates what may sometimes be accomplished by the judicious exercise of tact and common sense: —

Before beginning, Mr. Robinson made a speech, in which he called attention to the fact that a complaint had been made to the State Fishery Commission that the submarine mines exploded last week had killed many thousands of fish, and that Deputy Fish Commissioners D. F. Shea of Ware and John F. Luman of Thorndike had warned them not to violate the law regarding the use of dynamite in the water. Consequently, instead of using submarine mines, the bombs were exploded from the tops of the miniature warships. The fireworks were greatly enjoyed, and everybody expressed entire satisfaction with the evening's entertainment.

The item last quoted refers to the use of fireworks on Lake Quinsigamond, as an attraction for people gathering at the

park; there being no purpose whatever to injure or destroy fish. As a matter of fact only a few fish were killed, so far as could be determined, and the park management very gladly consented not to continue to explode bombs in the water when their attention was invited to probable results.

The following extracts from reports of deputies, mostly of the unsalaried class, will furnish additional facts bearing on the results of the enforcement of law: —

There have been no violations of the fish and game laws that have come to my notice this year. — EDWARD F. SNOW, Nantucket.

There is not so much Sunday gunning down here as there was. — W. M. GAMMONS, Marion.

There has been very little shooting out of season. — B. F. RICHARDS, Weymouth Heights.

I have not heard of any violation of the game laws. — F. R. SMITH, Braintree.

The boat put in commission in July has aided in a number of arrests, and hundreds of small lobsters have been returned to the water when the violators of the lobster law saw the boat approaching. I am told by reliable parties that the profits of some of the violators have been small, and others have been put out of business. I have every reason to believe that if a boat of good speed were put in commission earlier in the season good work could be accomplished. — OTIS THAYER, Quincy.

Fishermen now begin to think that the Fish and Game Commission has done great work in behalf of the fishing industries. — FRANK SERRILLA, Boston.

Sunday hunting seems to have stopped. — A. GREENQUIST, Roslindale.

I have visited during the past season all the localities in which snaring and shooting out of season used to be practised, but have seen very few indications of anything illegal. — W. E. QUIGGLE, Boston.

It seems to me that the law should be so amended as to impose a fine for each and every bird illegally killed, as under the present law the courts rarely impose a fine of more than \$10, even though, as in

a recent case in this vicinity, a man is found with ten birds in his possession. It seems absurd to impose the same fine for one or ten birds. — J. W. BAILEY, Arlington.

The game laws are being lived up to very well now in this section. — GEORGE H. HASSAM, Needham.

There has been a marked decrease in Sunday shooting in my immediate neighborhood. — PARKER H. KEMBLE, Sudbury.

Fishermen and hunters in this vicinity have respected the game laws better this year than years past. — ETHAN BOTHWELL, Northborough.

Have travelled all to-day (November 30) in the woods and have heard neither dogs nor guns, and Sunday hunting in this vicinity seems to be a thing of the past. Have been all along the Rhode Island border for seven or eight miles, and there never was a time, so long as I can remember, when shooting could not be heard in every direction Sundays this side of the Rhode Island line. It looks as though they had made up their minds to respect the Sunday law more than they did a year or two ago. — HERBERT A. BENT, Franklin.

Sunday hunting has not been indulged in as much as in former years. — DANIEL D. ROSE, Hudson.

To return to Sunday hunting; the morning of August 31 a few started in for keeps, but in just three Sunday mornings it was all over. All was very quiet up to the first Sunday in October. I was out of town. . . . The following Sunday it rained. . . . The third Sunday, October 19, Deputies Putnam, Prentiss and I bagged a couple of Sunday hunters, and they settled the following morning to the tune of \$10 and \$30. I have been out every Sunday since, but have heard only a very few guns, and they were so far away they could scarcely be heard. — JOHN L. MARTIN, Milford.

Gunners have more regard for the game laws than they did have a few years ago. — H. E. MCINTIRE, Reading.

We are bothered very little by law breakers. — A. J. KENNEDY, Lancaster.

Sunday shooting has gone out of style this season. — GEORGE W. GOLDSMITH, Beverly.

I have found but few snares around this part of the State. — A. J. RAUSCH, Lawrence.

I found one man with a ferret in his possession and made him kill it and promise not to use one again. There has been very little if any Sunday hunting. — A. CAMPBELL, Oxford.

After three men were fined, October 19, for Sunday hunting in Milford, Deputy Pogue of that town says: —

I have not heard a report of a gun on Sunday in this section, and I have not seen any one who has. I have been out every Sunday since.

To-day (Sunday, November 30) I have been out through the Brookfields and South Spencer, but did not see any hunters or hear any guns. — A. D. PUTNAM, Spencer.

It is a pleasure to note the change that has taken place in this vicinity within the past few years. A large majority of our citizens fully realize that the fish and game laws must be enforced. I have not heard one-half dozen reports of firearms on the Sabbath, whereas, a few years ago, it was bang, bang, nearly all day, within sound of the church bells. — JAMES H. GAFNEY, Petersham.

There is very little Sunday hunting done here. — DANIEL A. WARREN, West Upton.

The Sunday shooting in Ludlow grows less every season. — CHARLES A. WHITE, Ludlow.

Sunday hunters are beginning to realize that Sunday is close season. — F. J. PROCTOR, Fitchburg.

There have been but very few violations in my immediate section. I have, in the discharge of my official duty, visited 120 cities and towns in Massachusetts during the past year. There has been but very little snaring of birds in this section except by persons who own their own land. The public, as a general rule, have appreciated the good work now going on, and all express a desire that it may continue; they predict in less than five years Massachusetts will stand at the head so far as excellent hunting and fishing are concerned. All have a good word for the commission in their endeavor to do the most with the funds available.

I am sure if the commissioners could have heard the many complimentary remarks from hunters of birds and game which have come to

me about the good work towards the preservation of game, which has resulted in the covers being filled with all kinds of game, they would feel more than pleased to know that their interesting work is commencing to show itself and in a manner which leaves no room for doubt. Every hunter with whom I came in conversation within the past two days has expressed himself as being more than surprised at the wonderful amount of birds in the covers this season. October first did not prove to be an ideal day, as it was wet and rainy, but what few ventured out returned with good bags of game, — grouse, quail and squirrel. The covers were found very leafy and good shooting was not easy. It was not an uncommon thing to flush four and five birds at a time. One hunter says he counted five grouse on an old apple tree and they were in no hurry to leave. He managed to get three out of the bunch. Quail are so thick that it is an easy task to strike a bunch at intervals along the highways. I can say with pleasure that the law forbidding the sale of birds has this year commenced to show itself in no unmistakable manner, and as a result there will be abundant sport for the next two months which has not been equalled in ten years. — JOHN F. LUMAN, Palmer.

The people around here are mostly in favor of the enforcement of the fish and game laws, and especially Sunday hunting. There has been but very little violation in these parts. — A. L. PRATT, Belchertown.

There has been some violation of the fish and game laws this year, but not so much as last year. — EDWARD MILLER, Northampton.

Everything has been very satisfactory in this vicinity this season. — WILLIAM LEIPPLE, Greenfield.

I have not found or heard of any Sunday hunting this season. — M. J. CRANSON, Buckland.

There is a constantly growing respect for the game laws in this vicinity, and the honest sportsmen and citizens in general seem to be more and more anxious to see the game laws enforced. — LYMAN E. RUBERG, Hoosac Tunnel.

I think that the people are living up to the fish and game laws better and better each year. — A. M. NICHOLS, North Adams.

The report this week (November 30) finishes the open season, and, everything considered, the laws have been very well observed in this section. — DWIGHT M. COUCH, Pittsfield.

Deductions from the Work.—The work accomplished by this commission in the enforcement of fish and game laws admits of the following deductions:—

1. While it is highly important to the continuance of certain wild species that wise laws for their protection should be enacted, observation emphasizes the fact that such laws, unless they are vigorously and fairly enforced, are a menace rather than a benefit, so far as the public is concerned; they simply cumber the statute books and are a byword and reproach to the State.

2. Effectiveness of service, which is of paramount importance, can be secured only by (a) reasonable provision for the work in the way of appropriation; (b) by having a well-considered organization, in which proved merit alone shall be considered as a proper basis for retention in office or advancement; (c) by having the force entirely under the direction, and subordinate to, the commission, so that no question of divided responsibility can arise, and also to insure well-directed effort that shall be prompt and co-operative as occasion demands, as well as intelligent and effective.

3. Certain fish and game laws cannot be enforced without a power-driven boat. Such a boat should be built from a special design, to insure adaptability, and should be provided with accommodations suitable at least for the temporary stay on board of her crew.

4. The regular force should be increased to the extent of one man, if no more, so that a man can be selected as a deputy, with knowledge of machinery sufficient to enable him to manage a naphtha engine, and with experience in running boats along the coast.

The proper enforcement of fish and game laws is not only creditable to the State but is of large public benefit, which will become more apparent with the passage of years. Any money expended in this effort will probably be indirectly repaid to the State many times over.

NEW LEGISLATION.

We recommend the following changes in the fish and game laws:—

Section 19, chapter 91, Revised Laws, should be amended

by the addition of the following clause after the word “enforced:” “The commissioners may restock a pond with fish and extend the provisions of this section for an additional period of three years whenever they receive a petition as herein provided,” so that the act as revised may read as follows:—

SECTION 19. The commissioners, upon the petition of the mayor and aldermen of a city or of the selectmen of a town within which a great pond or a portion thereof is situated, or of thirty or more inhabitants thereof, shall cause the waters of such pond to be stocked with such food fish as they judge to be best suited to such waters. They shall thereupon prescribe, for a period not exceeding three years, such reasonable regulations relative to the fishing in such ponds and their tributaries, with such penalties, not exceeding twenty dollars for one offence, as they deem to be for the public interest, and shall cause such regulations to be enforced. The commissioners may restock a pond with fish and extend the provisions of this section for an additional period of three years whenever they receive a petition as herein provided. Five hundred dollars shall be annually appropriated by the commonwealth to carry out the provisions of this section.

Section 93, chapter 91, Revised Laws, should be amended by adding after the last word the following words: “No person shall exercise the rights herein granted the commissioners unless acting under their authority,” so that the section shall read as follows:—

SECTION 93. The commissioners on fisheries and game may occupy and use any small estuaries or creeks within the commonwealth, not exceeding six, for the scientific investigation of the habits, propagation and distribution of lobsters, if such occupation and use does not impair the private rights of any person or materially obstruct any navigable waters. Notice of such occupation shall be conspicuously posted and maintained by said commissioners at the nearest points to said estuaries and creeks, and shall be recorded in the registry of deeds in the county in which they are situated. No person shall exercise the rights herein granted the commissioners unless acting under their authority.

Section 88, chapter 91, Revised Laws, should be amended by inserting after the word “and” the words “the holding in confinement of any lobster, or,” so that the section will read as follows:—

SECTION 88. Whoever sells or offers for sale or has in his possession an uncooked lobster less than ten and one-half inches in length, or a cooked lobster less than ten and one-quarter inches in length, measuring from the extremity of the bone protruding from the head to the end of the bone of the middle flipper of the tail of the lobster, extended on its back its natural length, shall forfeit not more than five dollars for every such lobster, one-half to the use of the city or town in which the offence is committed and one-half to the commonwealth; and in all prosecutions under the provisions of this section any mutilation of a lobster, cooked or uncooked, which affects its measurement shall be *prima facie* evidence that the lobster is less than the required length and the holding in confinement of any lobster, or the possession of any lobster, cooked or uncooked, which is not of the required length shall be *prima facie* evidence to convict.

Section 89, chapter 91, Revised Laws, should be amended by adding after "possession" the words "or has in possession uncooked lobster meat," and by adding after the word "body" the words "or of any uncooked lobster meat," so that the section will read as follows:—

SECTION 89. Whoever, before a lobster is cooked, mutilates it by severing the tail from the body, or has such tail in possession, or has in possession uncooked lobster meat, shall be punished by a fine of five dollars for each offence; and in all prosecutions under the provisions of this section the possession, by any person, of the tail of any uncooked lobster so severed from the body or of any uncooked lobster meat shall be *prima facie* evidence to convict.

Section 7, chapter 92, Revised Laws, should be amended by adding after the word "dollars" the words "for each bird taken or killed or each nest disturbed or destroyed contrary to the provisions of this section," so that the section will read as follows:—

SECTION 7. Whoever takes or kills a wild or undomesticated bird not named in sections two, three, four and five, except English sparrows, crow blackbirds, crows, jays, birds of prey, wild geese and fresh water and sea fowl not named in said sections, or wilfully destroys, disturbs or takes a nest or eggs of any wild or undomesticated birds, except such as are not protected by the provisions of this section, shall be punished by a fine of ten dollars for each bird taken or

killed or each nest disturbed or destroyed contrary to the provisions of this section; but a person over twenty-one years of age, who has a certificate from the commissioners on fisheries and game or from the president of the Boston Society of Natural History that he is engaged in the scientific study of ornithology or is collecting in the interest of a scientific institution, may at any season take or kill or take the nests and eggs of an undomesticated bird, except woodcock, ruffed grouse and quail; but the provisions of this section shall not authorize a person to enter upon private grounds without the consent of the owner thereof for the purpose of taking nests or eggs or killing birds. Said commissioners or the president of said society may at any time revoke such certificate.

Section 8, chapter 92, Revised Laws, should be amended by adding after the words “preceding section” the words “or of section five of this chapter,” so that the section will read as follows:—

SECTION 8. Whoever has in possession the body or feathers of a bird, the taking or killing of which is prohibited by the provisions of the preceding section or of section five of this chapter, whether taken in this commonwealth or elsewhere, or wears such feathers for the purpose of dress or ornament, shall be punished by a fine of ten dollars; but the provisions of this section shall not prohibit the taking or killing of such birds by the holders of certificates provided for in the preceding section, nor shall they apply to natural history associations or to the proprietors of museums, or other collections for scientific purposes, or to non-residents of the commonwealth passing through it or temporarily dwelling therein.

Section 133 of chapter 91, Revised Laws, should be amended by inserting after the word “compound” the words “or whoever kills or destroys fish by the use of dynamite or other high explosive or explodes dynamite or powder in fishing waters,” so that the section, as revised, shall read as follows:—

SECTION 133. Whoever puts or throws into any waters for the purpose of taking or destroying fish therein any poisonous substance, simple, mixed or compound, or whoever kills or destroys fish by the use of dynamite or other high explosive or explodes dynamite or powder in fishing waters, shall forfeit ten dollars for each offence.

Section 5, chapter 56, Revised Laws, should be repealed.

Authorization should be given the Fish and Game Commission to submit reports covering the year ending December 31.

The commission desires authorization to call a convention of State and Provincial commissioners to consider the desirability of uniform legislation regarding the lobster and other matters, or to attend a convention if called elsewhere.

COURTESIES.

This commission has received from the United States Fish Commission consignments of eggs of brook trout, rainbow trout and landlocked salmon; also shad fry. In addition we have received statements of the fish cultural work of the federal government in this State, statistics of fish landed at Boston and Gloucester and various other publications of the United States Fish Commission. We have likewise received a fresh specimen of the tile fish.

The post-office authorities and various railroads have permitted the display of posters containing abstracts of fish and game laws. The railroads traversing the State, notably those controlled by the Boston & Maine and the New York, New Haven & Hartford companies, have, as formerly, carried, free, shipments of fish, birds and animals intended for distribution or propagation.

Mr. A. F. Rich has presented the commission with photographs of the fishing steamers "New England" and "Kingfisher." Capt. Solomon Jacobs has given us blue prints of the plans of the fishing steamer "Alice M. Jacobs."

Mr. R. M. Benner has given the commission blue prints of the builders' plans of a naphtha fishing dory.

Mr. Thomas B. McManus has furnished us with a plan of the schooner "Helen B. Thomas," showing the new rig for fishing vessels.

Mr. H. W. Spooner has sent the commission, through Deputy Nixon, two photographs of the auxiliary schooner "Constellation." One of these shows the vessel under full sail and power and one under power alone.

Mr. Tony S. Veader has presented to the commission a liv-

ing lobster with the tail bitten or cut off close to the carapace and the wound healed.

Mr. Charles N. Hunt has presented to the commission a mounted specimen of a young gannet or solan goose and a male mallard duck.

Mr. Thomas L. Burney has given the commission the mounted head of a pike.

Acknowledgments are made elsewhere for specimens of foreign game birds received from the management of the Sportsman's Show.

The commission has been privileged to extend courtesies in the following instances: —

To the United States Fish Commission, permitting the collection of egg-bearing lobsters; the operation of a pound net for scientific purposes, etc.

The commission has been able to continue assisting Mr. W. E. Castle of the Museum of Comparative Zoölogy, at Cambridge, in securing and holding in confinement certain material necessary for the conduct of special scientific researches.

Letters of introduction to prominent citizens of Grimsby, Eng., have been furnished by the chairman to Mr. M. I. Shimoda of Japan, who was about to visit England for the purpose of studying its fisheries, and especially the trawl fisheries.

Deputy Thomas S. Holmes has been authorized to collect lampreys to be used for scientific purposes by the following persons: Prof. J. Percy Moore, University of Pennsylvania, Philadelphia, Pa., and Prof. E. L. Mark, director, Zoölogical Laboratory, Harvard University, Cambridge, Mass.

Permits have been issued to the following parties to collect birds and eggs for scientific purposes: J. Bion Richards, Fall River; Owen Durfee, Fall River; A. C. Bent, Taunton; Robert O. Morris, Springfield; Frederic H. Kennard, Boston; George H. Mackay, Nantucket; Homer L. Bigelow, Boston; Dr. J. W. Bailey, Boston; Dr. C. F. Hodge, Worcester; Albert E. Jewett, Clinton; Bradford A. Scudder, Taunton.

Permits to take sand eels for bait have been issued to the following: Andrew E. Hunt, Frank E. Hunt, Albion P. Hilton, Charles F. Lattime, William H. Pierce, James H.

Thurlow, Richard Pierce, Charles W. Eustis, Newburyport; Samuel Kilborn, John D. Kilborn, Samuel Bayley, Charles A. Bayley, Charles H. Small, Albert E. Post, John W. Post, Albert H. Leet, Clarence Leet, Stephen Caswell, Thomas Roberts, Robert L. Gove, Samuel A. Hicks, Edward Pool, Samuel S. Bayley, Edward E. Wells, Daniel D. Wells, Charles P. Rust, Peter Rhodes, John T. Harris, J. Lewis Grant, Ipswich; James A. Carter, Thomas F. Coleman, Rowley.

J. W. COLLINS.

E. A. BRACKETT.

J. W. DELANO.

APPENDIX.

[A.]

LIST OF COMMISSIONERS.

UNITED STATES COMMISSION OF FISH AND FISHERIES, WASHINGTON, D. C.

George M. Bowers, Commissioner.

Irving H. Dunlap, Chief Clerk.

Hugh M. Smith, Assistant in charge of Division of Inquiry respecting Food Fishes.

Jno. W. Titcomb, Assistant in charge of Division of Fish Culture.

B. W. Evermann, Assistant in charge of Division of Statistics.

Superintendents of United States Fisheries Stations.

Charles G. Atkins, Craig Brook, East Orland, Me.

E. E. Race, Green Lake, Me.

Edgar N. Carter, St. Johnsbury, Vt.

Waldo F. Hubbard, Nashua, N. H.

C. G. Corliss, Gloucester, Mass.

E. F. Locke, Woods Hole, Mass.

L. G. Harron (in charge), Bryan's Point, Md.

John E. Brown (in charge), Central Station, Washington, D. C.

George A. Seagle, Wytheville, Va.

Alexander Jones, Erwin, Tenn.

S. G. Worth, Edenton, N. C.

J. J. Stranahan, Cold Spring, Bullochville, Ga.

Livingstone Stone, Cape Vincent, N. Y.

S. W. Downing, Put-in-Bay, Ohio.

Frank N. Clark, Northville, Mich.

S. P. Wires, Duluth, Minn.

R. S. Johnson, Manchester, Iowa.

Dr. S. P. Bartlett, Quincy, Ill.

H. D. Dean, Neosho, Mo.

John L. Leary, San Marcos, Tex.

DeWitt C. Booth, Spearfish, So. Dak.

E. A. Tulian, Leadville, Col.

James A. Henshall, Bozeman, Mont.

H. H. Buck, Baker Lake, Wash.

J. Nelson Wizner, Clackamas, Ore.

Giles H. Lambson, Baird and Battle Creek, Cal.

R. K. Robinson, White Sulphur, West Va.

ARKANSAS.

H. H. Rottaken, President,	. . . . .	Little Rock.
W. B. Worthen, Secretary and Treasurer,	. . . . .	Little Rock.

CALIFORNIA.

H. W. Keller, President,	. . . . .	Santa Monica.
W. W. Van Arsdale,	. . . . .	San Francisco.
W. E. Gerber,	. . . . .	Sacramento.

COLORADO.

Game and Fish.

Charles W. Harris,	. . . . .	Denver.
A. A. Gordon, Secretary,	. . . . .	Denver.
T. J. Holland, Superintendent of Hatcheries,	. . . . .	Denver.

CONNECTICUT.

George T. Mathewson, President,	. . . . .	Thompsonville.
Robert G. Pike,	. . . . .	Middletown.
E. Hart Geer, Secretary,	. . . . .	Hadlyme.

DELAWARE.

E. G. Shortlidge,	. . . . .	Wilmington.
J. Thomas Lowe,	. . . . .	Little Creek.

FLORIDA.

John Y. Detwyler, President,	. . . . .	New Smyrna.
John G. Ruge, Secretary,	Appalachicola.

GEORGIA.

A. T. Dallis, Superintendent of Fisheries,	LaGrange.
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ILLINOIS.

Nathaniel H. Cohen, President,	Urbana.
S. P. Bartlett, Secretary and Superintendent,	Quincy.
A. Lenke, Treasurer,	Chicago.

INDIANA.

Z. T. Sweeney,	Columbus.
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IOWA.

Fish and Game.

George A. Lincoln,	Cedar Rapids.
L. and A. S. Peterson, Assistants.		

KANSAS.

J. W. Haughey, Welling.

MAINE.

Fish and Game.

L. T. Carleton, Chairman, Winthrop.

Henry O. Stanley, Dixfield.

Edgar E. Ring, Orono.

Sea and Shore Fisheries.

A. R. Nickerson, Boothbay Harbor.

MARYLAND.

Jesse W. Downey, New Market.

Clarence L. Vincent, Snow Hill.

MASSACHUSETTS.

Joseph W. Collins, Chairman, Boston.

Edward A. Brackett, Secretary, Winchester.

John W. Delano, Superintendent of Hatcheries, Marion.

Office, State House, Boston, Mass.

MICHIGAN.

George M. Brown, President, Saginaw.

F. B. Dickerson, Vice-President, Detroit.

C. D. Joslyn, Detroit.

Seymour Bower, Superintendent, Detroit.

J. H. Johnson, Treasurer, Detroit.

George D. Mussey, Secretary, Detroit.

MINNESOTA.

Game and Fish Commissioners. (Office at Capitol.)

Uri L. Lamprey, President, St. Paul.

W. P. Hill, Vice-President, Fairmont.

D. W. Meeker, Secretary, Moorhead.

H. G. Smith, Treasurer, Winona.

S. F. Fullerton, Executive Agent, St. Paul.

MISSOURI.

Frank P. Yenawine, President, St. Joseph.

John N. Shepler, Vice-President, Milan.

Richard Porter, Secretary, Paris.

John H. Zollinger, Boonville.

George J. Chapman,	.	.	.	.	.	.	St. Louis.
Phillip Kopplin, Jr.,	.	.	.	.	.	.	St. Louis.
M. E. O'Brian,	.	.	.	.	.	.	St. Louis.

NEBRASKA.

Game and Fish Commission.

Ezra P. Savage, Commissioner,	.	.	.	.	.	Lincoln.
George B. Simpkins, Chief Deputy,	.	.	.	.	.	Lincoln.
W. J. O'Brien, Superintendent of Hatcheries,	.	.	.	.	.	South Bend.

NEW HAMPSHIRE.

Nathaniel Wentworth, Chairman,	.	.	.	.	.	Hudson Centre.
Merrill Shurtleff,	.	.	.	.	.	Lancaster.
C. B. Clarke,	.	.	.	.	.	Concord.

NEW JERSEY.

Howard P. Frothingham, President and Treasurer,	.	.	.	.	.	Pompton Lakes.
William A. Halsey,	.	.	.	.	.	Newark.
Benjamin P. Morris,	.	.	.	.	.	Long Branch.
Richard T. Miller,	.	.	.	.	.	Camden.
George Riley, Protector,	.	.	.	.	.	Newark.

NEW YORK.

Forest, Fish and Game.

Timothy L. Woodruff,	.	.	.	.	.	Brooklyn.
DeWitt C. Middleton,	.	.	.	.	.	Watertown.
Charles H. Babcock,	.	.	.	.	.	Rochester.
John D. Whish, Secretary,	.	.	.	.	.	Albany.

OHIO.

J. L. Rodgers, President,	.	.	.	.	.	Columbus.
Paul North,	.	.	.	.	.	Cleveland.
Dr. D. W. Greene,	.	.	.	.	.	Dayton.
Thomas B. Paxton,	.	.	.	.	.	Cincinnati.
Edwin M. Kennedy,	.	.	.	.	.	McConnellsville.
J. C. Porterfield, Chief Warden,	.	.	.	.	.	Columbus.
George C. Blankner,	.	.	.	.	.	Columbus.

OREGON.

Governor, T. T. Geer,	.	.	.	.	.	Salem.
Secretary of State, F. I. Dunbar,	.	.	.	.	.	Salem.
State Treasurer, C. S. Moore,	.	.	.	.	.	Salem.
L. P. W. Quimby, Game and Forestry Warden,	.	.	.	.	.	Portland.
H. G. VanDusen, Master Warden,	.	.	.	.	.	Astoria.

PENNSYLVANIA.

Fisheries Commission.

S. B. Stillwell, President,	.	.	.	.	.	.	Scranton.
W. E. Meehan, Secretary,	.	.	.	.	.	.	Philadelphia.
H. C. Demuth, Treasurer,	.	.	.	.	.	.	Lancaster.
James A. Dale, Corresponding Secretary,	.	.	.	.	.	.	York.
John Hamberger,	.	.	.	.	.	.	Erie.
James W. Correll,	.	.	.	.	.	.	Easton.

Game Commission.

William M. Kennedy, President,	.	.	.	.	.	.	Pittsburgh.
C. K. Sober,	.	.	.	.	.	.	Lewisburg.
James H. Worden,	.	.	.	.	.	.	Harrisburg.
William H. Myers,	.	.	.	.	.	.	Williamsport.
Charles B. Penrose,	.	.	.	.	.	.	Philadelphia.
J. O. H. Denney,	.	.	.	.	.	.	Ligonier.
Joseph Kalbfus, Secretary,	.	.	.	.	.	.	Harrisburg.

RHODE ISLAND.

J. M. K. Southwick, President,	.	.	.	.	.	.	Newport.
Henry T. Root, Treasurer,	.	.	.	.	.	.	Providence.
Charles W. Willard,	.	.	.	.	.	.	Westerly.
A. D. Mead, Brown University, P.W.D.,	.	.	.	.	.	.	Providence.
William P. Morton, Secretary,	.	.	.	.	.	.	Providence.
Adelbert D. Roberts,	Woonsocket.
William H. Boardman,	Central Falls.

UTAH.

John Sharp,	Salt Lake City.
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VERMONT.

E. A. Davis,	Bethel.
H. G. Thomas,	Stow.

VIRGINIA.

Frank Fletcher, Chairman,	Jenkins Bridge.
Seth F. Miller, Secretary,	.	.	.	.	.	.	Foster.
John A. Curtis,	.	.	.	.	.	.	Richmond.
George B. Keezell,	.	.	.	.	.	.	Keezelltown.
Pembroke Pettit,	.	.	.	.	.	.	Palmyra.

WASHINGTON.

Governor, Henry G. McBride,	.	.	.	.	.	.	Olympia.
State Treasurer, C. W. Maynard,	.	.	.	.	.	.	Olympia.
T. R. Kershaw, Commissioner,	.	.	.	.	.	.	Whatcom.

WISCONSIN.

Governor, Robert M. LaFollette, ex officio,	. . .	Madison.
Edwin E. Bryant, President,	. . .	Madison.
William J. Starr,	. . .	Eau Claire.
Calvert Spensely, Treasurer,	. . .	Mineral Point.
James J. Hogan,	. . .	La Crosse.
Henry D. Smith,	. . .	Appleton
Currie G. Bell,	. . .	Bayfield.
Edward A. Birge, ex officio, Professor of Zoölogy, University of Wisconsin, Secretary,	. . .	Madison.
James Nevin, Superintendent,	. . .	Madison.

WYOMING.

D. C. Nowlin, State Game Warden,	. . .	Big Piney.
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[B.]

DISTRIBUTION OF FOOD FISH.

BROOK TROUT.

Fry distributed from the Sutton Hatchery during the Months of April and May, 1902.

APPLICANTS.	Name of Waters.	Town.	Number.
Geo. C. Randles, . . .	Northbridge Brook, . . .	Sutton, . . .	10,000
Albert W. Going, . . .	Purgatory Brook, . . .	Sutton, . . .	10,000
Warren B. Maxwell, . . .	Merriam Brook, . . .	Grafton, . . .	5,000
Frank E. Vinton, . . .	Crosby Brook, . . .	Grafton, . . .	5,000
Theodore F. Smith, . . .	Hudson Brook, . . .	Grafton, . . .	5,000
F. K. Snyder, . . .	Chase Brook, . . .	Grafton, . . .	5,000
C. N. Putnam, . . .	Misco Brook, . . .	Grafton, . . .	5,000
Geo. L. Gill, . . .	Northbridge Brook, . . .	Northbridge, . . .	5,000
C. V. Dudley, . . .	Prentice Brook, . . .	Northbridge, . . .	5,000
Edwin Vickers, . . .	Turtle Brook, . . .	Marlborough, . . .	5,000
W. D. Lepper, . . .	Lovett Brook, . . .	Marlborough, . . .	5,000
W. D. Lepper, . . .	Round Hill Brook, . . .	Marlborough, . . .	5,000
Chas. W. Leach, . . .	Rocky Hill Brook, . . .	Marlborough, . . .	5,000
Fred Smith, . . .	Stowe Brook, . . .	Marlborough, . . .	5,000
E. W. Lindley, . . .	Fort Meadow Brook, . . .	Marlborough, . . .	5,000
H. P. Andrews, . . .	Sandy Brook, . . .	Stow, . . .	5,000
H. P. Andrews, . . .	Hog Brook, . . .	Hudson, . . .	5,000
E. D. Marchesseault, . . .	Howe and Drake Brooks, . . .	Spencer, . . .	5,000
E. D. Marchesseault, . . .	Robinson and Smith Brooks, . . .	Spencer, . . .	5,000
E. D. Marchesseault, . . .	Wilson and Goodnow Brooks, . . .	Spencer, . . .	5,000
C. W. Goodwin, . . .	Tunney Brook, . . .	West Brookfield, . . .	5,000
C. W. Goodwin, . . .	Beeman Brook, . . .	West Brookfield, . . .	5,000
C. W. Goodwin, . . .	Bemis Brook, . . .	Sturbridge, . . .	5,000
C. W. Goodwin, . . .	Winnimisset Brook, . . .	New Braintree, . . .	5,000
C. W. Goodwin, . . .	Sucker Brook, . . .	New Braintree, . . .	5,000
C. W. Goodwin, . . .	Bemis Brook, . . .	Fiskdale, . . .	5,000
Chester B. Williams, . . .	Snake and Bullard Brooks, . . .	Wayland, . . .	25,000
Wm. A. Soper, . . .	Slab Brook, . . .	Westfield, . . .	10,000
R. K. Andrews, . . .	Cold Spring Brook, . . .	Westfield, . . .	5,000
H. F. Snow, . . .	Timber Swamp Brook, . . .	Westfield, . . .	5,000
C. A. Pierce, . . .	Hollister Brook, . . .	Westfield, . . .	5,000
L. H. Bowers, . . .	Oak Orchard Brook, . . .	Westfield, . . .	5,000
W. J. Morton, . . .	White Brook, . . .	Westfield, . . .	5,000
Alfred Read, . . .	Winchell Brook, . . .	Westfield, . . .	5,000
Geo. R. Bowers, . . .	Powder Mill Brook, . . .	Westfield, . . .	5,000
H. R. Stiles, . . .	Ponders Hollow Brook, . . .	Westfield, . . .	5,000
O. O. Oliver, . . .	Jacks Brook, . . .	Westfield, . . .	5,000
W. S. Marsh, . . .	Tekoa Brook, . . .	Westfield, . . .	5,000
O. F. Fuller, . . .	Hop and Fox Brooks, . . .	Blackstone, . . .	10,000
J. D. Mason, . . .	Church Hill Brook, . . .	Templeton, . . .	5,000
J. D. Mason, . . .	Carters Brook, . . .	Templeton, . . .	5,000
E. P. Tyler, . . .	Blackmer Brook, . . .	Dana, . . .	5,000
Henry Brandes, . . .	Upham and Potash Brooks, . . .	Dudley, . . .	10,000
Henry Brandes, . . .	Muse and Freeman Brooks, . . .	Webster, . . .	10,000
W. H. Emerson, . . .	Potter and Trim Howell Brooks, . . .	Douglas, . . .	10,000
Chas. L. Allen, . . .	Weasel Brook, . . .	Worcester, . . .	10,000
H. J. Bell, . . .	Mammouth Brook, . . .	Leominster, . . .	5,000
H. J. Bell, . . .	Monoosnock Brook, . . .	Leominster, . . .	5,000
H. J. Bell, . . .	Spec Pond Brook, . . .	Lancaster, . . .	5,000
H. J. Bell, . . .	Wekepeke Brook, . . .	Lancaster, . . .	5,000
H. J. Bell, . . .	Massapoag Brook, . . .	Lunenburg, . . .	5,000
H. J. Bell, . . .	Heywards Brook, . . .	Lunenburg, . . .	5,000
			320,000

Fry distributed from the Hadley Hatchery during the Months of April and May, 1902.

APPLICANTS.	Name of Waters.	Town.	Number.
S. E. Bliss,	Leaping Well Brook,	South Hadley,	5,000
Thomas F. Buckley,	Goepel Brook,	South Hadley,	5,000
Geo. Hofman,	Elmer Brook,	South Hadley,	5,000
E. E. Pomeroy,	Stony Brook,	South Hadley,	5,000
A. D. Cooke,	Castleboro Brook,	South Hadley,	5,000
F. E. White,	McGrath Brook,	South Hadley,	5,000
M. F. Lyons,	Willimansett Brook,	Chicopee,	5,000
W. H. Roberts,	Poor Brook,	Chicopee,	5,000
Wm. O. Kemfield,	Cooley Brook,	Chicopee,	5,000
Jos. R. Beaudoin,	Fuller Brook,	Chicopee,	5,000
Chas. C. Russell,	Mountain Brook,	Deerfield,	5,000
Chas. C. Russell,	Andrews Brook,	Shelburne,	5,000
Chas. C. Russell,	Pratt Brook,	Shelburne,	5,000
Chas. C. Russell,	Bardwell Brook,	Greenfield,	5,000
Chas. C. Russell,	Phillips Brook,	Greenfield,	5,000
H. R. Davidson,	Amethyst Brook,	Pelham,	5,000
R. W. Aldrich,	Wedge Brook,	Pelham,	5,000
G. P. Bartlett,	Buffum Brook,	Pelham,	5,000
J. R. Andrews,	Cooke Brook,	Pelham,	5,000
Dwight L. Crafts,	Roaring Brook,	Whately,	5,000
B. W. Mayo,	Long Meadow Brook,	Sunderland,	5,000
Geo. M. Darby,	Poland Brook,	Conway,	5,000
A. M. Lyman,	Washhouse Brook,	Montague,	5,000
A. M. Lyman,	Noisy Brook,	Montague,	5,000
C. H. Green,	Warwick Brook,	Northfield,	5,000
W. A. Smith,	Highland Brook,	Goshen,	5,000
W. W. Smith,	Rogers Brook,	Goshen,	5,000
F. S. Dresser,	Packard Brook,	Goshen,	5,000
E. L. Culver,	Hampshire Brook,	Goshen,	5,000
C. E. Bass,	Smith Brook,	Warwick,	5,000
Homer C. Taylor,	Stony Brook,	Granby,	5,000
L. W. Taylor,	Muddy Brook,	Granby,	5,000
Chas. L. Hoag,	Slip Brook,	Granby,	5,000
F. H. Graves,	Little Brook,	Granby,	5,000
C. C. Newell,	Sugar Brook,	Granby,	5,000
John Prokop,	Landville Brook,	Westhampton,	5,000
Adolph Sweeney,	Turkey Hill Brook,	Westhampton,	5,000
Chas. Gould,	Roberts Meadow Brook, west branch,	Westhampton,	5,000
Chas. H. Sawyer,	Roberts Meadow Brook, east branch,	Westhampton,	5,000
Louis Gaylor,	Roberts Meadow Brook,	Westhampton,	5,000
Albert Longdon,	Mosquito Hollow Brook,	Williamsburg,	5,000
E. P. Feiker,	Broad Brook,	Hatfield,	5,000
Sam'l Spencer,	Running Gutter Brook,	Hatfield,	5,000
J. G. Thayer,	Running Gutter Brook, west branch,	Hatfield,	5,000
Edward Miller,	Parsons Brook,	Easthampton,	5,000
Howard French,	Parsons Brook, west branch,	Northampton,	5,000
W. A. Sheldon,	Parsons Brook, east branch,	Northampton,	5,000
			235,000

Fry distributed from the Winchester Hatchery during the Months of April and May, 1902.

N. J. Hardy,	Winns Brook,	Belmont,	5,000
W. D. Higgins,	Winns Brook,	Belmont,	5,000
W. S. Allen,	Mitchells Brook,	Lexington,	5,000
Abbott Mitchell,	Browns Brook,	Lexington,	5,000
R. Wetherbee,	No name,	Bedford,	5,000
Geo. H. Sweetnam,	Elm Brook,	Bedford,	5,000
O. W. Whittemore,	Vine Brook,	Arlington,	5,000
E. L. Hawes,	Whites Brook,	Billerica,	5,000
L. L. Pierce,	Whittemore Brook,	Billerica,	5,000
F. A. Merriman,	McIntosh Brook,	Billerica,	5,000
C. H. Buss,	Beaver Hole Brook,	Burlington,	5,000

Winchester Hatchery—Concluded.

APPLICANTS.	Name of Waters.	Town.	Number.
L. A. White, . . .	Hamdens Brook,	Burlington,	5,000
John A. Chambers, . . .	Elm Brook,	Lincoln,	5,000
R. J. Durward, . . .	Halls Brook,	Woburn,	5,000
F. W. Clemson, . . .	Blanchard Brook,	Woburn,	5,000
W. J. Hammond, . . .	Fowles Brook,	Woburn,	5,000
S. M. Harvey, . . .	Shakerglen Brook,	Woburn,	5,000
John A. Sweetser, . . .	Cutlers Brook,	Woburn,	5,000
John O. Daniels, . . .	Holbrook Trout Brook,	Avon,	5,000
D. J. Wetherbee, . . .	Nashoba Brook,	Acton,	5,000
Chas. M. Kimball, . . .	Cemetery Brook,	Acton,	5,000
Chas. M. Kimball, . . .	Houghton Brook,	Acton,	5,000
Chas. M. Kimball, . . .	Taylor Brook,	Acton,	5,000
Chas. M. Kimball, . . .	Stony Brook,	Acton,	5,000
John A. Stevens, . . .	Smallpox Brook,	Salisbury,	5,000
C. F. Winch, . . .	Rock Brook,	Georgetown,	5,000
Wm. A. Butler, . . .	Walker Brook,	Georgetown,	5,000
C. P. Abbott, . . .	Morrills Brook,	Groveland,	5,000
Arthur E. Roberts, . . .	South Brook,	Reading,	5,000
Samuel Parker, . . .	Saugus River Brook,	Wakefield,	5,000
Daniel G. Whelton, . . .	Poor Brook,	Middleton,	10,000
Wm. E. Badger, . . .	Sams Brook,	Dracut,	5,000
L. W. Hall, . . .	Richardson Brook,	Dracut,	5,000
C. O. Hall, . . .	Varnums Brook,	Dracut,	5,000
Geo. L. Huntoon, . . .	Double Brook,	Dracut,	5,000
F. M. Palmer, . . .	Cuba Brook,	North Andover,	5,000
P. H. Ryan, . . .	Long Meadow Brook,	Tewksbury,	5,000
Richard Taff, . . .	No name,	Tewksbury,	5,000
H. E. Richardson, . . .	Snake Meadow Brook,	Westford,	5,000
H. E. Richardson, . . .	Spoon Handle Brook,	Tyngsborough,	5,000
Geo. L. Lawson, . . .	Uptons Brook,	Tyngsborough,	5,000
Robert J. Young, . . .	Spoon Handle Brook,	Dunstable,	5,000
Caleb L. Smith, . . .	Blind Brook,	Chelmsford,	5,000
			220,000

Fry distributed from the Adams Hatchery during the Months of April and May, 1902.

John L. Frizzell, . . .	Tuttle Brook,	Peru,	5,000
John L. Frizzell, . . .	Pierce Brook,	Peru,	5,000
John L. Frizzell, . . .	Fuller Brook,	Peru,	5,000
James S. Sanders, . . .	Benton Brook,	Otis,	10,000
James S. Sanders, . . .	Moulton Brook,	Otis,	10,000
James S. Sanders, . . .	Malthie Brook,	Otis,	10,000
James S. Sanders, . . .	Gibbs Brook,	Otis,	10,000
G. D. Gregory, . . .	Clam Brook,	Sandisfield,	10,000
S. B. Dyer, . . .	Shaw and Cole Brooks,	Plainfield,	10,000
Geo. W. Holt, . . .	Mitchell Brook,	Cummington,	5,000
Geo. W. Holt, . . .	Crosby Brook,	Cummington,	5,000
Geo. W. Holt, . . .	Shaw Brook,	Cummington,	5,000
Geo. W. Holt, . . .	Warner Brook,	Cummington,	5,000
Fred C. Brown, . . .	Ingalls and New Road Brooks,	Cheshire,	35,000
Geo. F. Sayles, . . .	Brown Brook,	Adams,	10,000
J. E. Cadogan, . . .	Yaescho Brook,	Adams,	10,000
Wm P. Martin, . . .	Fisk Brook,	Adams,	10,000
Willard E. Hoyt, . . .	Hopper Brook,	Williamstown,	5,000
S. G. Tenney, . . .	Leete and Sweet Brooks,	Williamstown,	10,000
A. M. Nichols, . . .	Hudson Brook,	Clarksburg,	10,000
James H. Krum, Jr., . . .	Tunnel and McManna Brooks,	Clarksburg,	20,000
W. S. Hathaway, . . .	Stork Brook,	Savoy,	5,000
F. N. Haskins, . . .	Haskins Brook,	Savoy,	5,000
N. B. Baker, . . .	Briar and Lower Brooks,	Savoy,	20,000
			235,000

Fingerling Brook Trout Plants — 1902.

APPLICANTS.	Name of Waters.	Town.	Number.
C. B. Jerome, . . .	Mountain Meadow Brook, . . .	North Adams, . . .	1,000
M. W. Thomas, . . .	Sherman Brook, . . .	North Adams, . . .	1,000
Geo. F. Sayles <i>et al.</i> , . . .	Tophet and Hall Brooks, . . .	Adams, . . .	1,000
Sanborn G. Tenney, . . .	Green River Brook, . . .	Williamstown, . . .	1,000
Geo. Z. Dean, . . .	Steam Saw Mill Brook, . . .	Hinsdale, . . .	1,000
W. H. Sherrill, . . .	Furnace Brook, . . .	Richmond, . . .	1,000
J. M. Stevenson, . . .	Sackett Brook, . . .	Dalton, . . .	1,000
E. L. Brown <i>et al.</i> , . . .	Anthony and Windsor Brooks, . . .	Dalton, . . .	1,000
C. M. Gibbs <i>et al.</i> , . . .	South Egremont Brook, . . .	Great Barrington, . . .	2,000
J. H. Casey, . . .	Green Water Brook, . . .	Lee, . . .	900
J. H. Wood, . . .	Sackett Brook, . . .	Pittsfield, . . .	2,000
John Harvey, . . .	Nonatiquot Brook, . . .	Randolph, . . .	900
Harry D. Hunt, . . .	Rabbit Hill Brook, . . .	Wrentham, . . .	1,000
R. G. Howard, . . .	Cooper Brook, . . .	Ashburnham, . . .	500
F. L. Hager, . . .	Bemans Brook, . . .	Winchendon, . . .	500
James F. Heath, . . .	Marshalls Brook, . . .	Taunton, . . .	900
W. H. Gale, . . .	Smith and Hedge Brooks, . . .	Warwick, . . .	1,500
Chas. M. Kimball, . . .	Houghtons Brook, . . .	South Acton, . . .	1,800
A. M. Lyman, . . .	Creamery Brook, . . .	Montague, . . .	900
H. Blandamer, . . .	Shattuck Brook, . . .	North Dana, . . .	500
H. E. Brown, . . .	Whittemore Brook, . . .	North Dana, . . .	500
L. S. Bailey, . . .	Raven and Josa Meadow Brooks, . . .	Middleborough, . . .	1,000
E. W. Tyler, . . .	Millers River Brook, . . .	Athol, . . .	1,000
Chas. C. Russell <i>et al.</i> , . . .	Punch and Fisk Brooks, . . .	Greenfield, . . .	900
John F. Hood <i>et al.</i> , . . .	Fall River Brook, . . .	Turners Falls, . . .	900
Geo. A. Flagg, . . .	Spruce Pond Brook, . . .	Boylston, . . .	500
E. F. Lansil, . . .	Hop and Run Brook, . . .	Sudbury, . . .	900
H. P. Andrews, . . .	Hog Brook, . . .	Hudson, . . .	450
W. D. Lepper <i>et al.</i> , . . .	Fort Meadow Brook, . . .	Marlborough, . . .	1,500
J. W. Jackson, . . .	Pudding Mill Brook, . . .	Belchertown, . . .	900
H. W. Rogers <i>et al.</i> , . . .	Mill Brook, . . .	West Upton, . . .	1,000
C. V. Dudley, . . .	Prentice and Carpenter Brooks, . . .	Northbridge, . . .	1,000
O. F. Fuller, . . .	Quickstream Brook, . . .	Blackstone, . . .	1,000
George Pogue <i>et al.</i> , . . .	George Brook, . . .	Grafton, . . .	1,000
C. L. Bush <i>et al.</i> , . . .	Biglow and Hollow Brooks, . . .	North Brookfield, . . .	1,800
C. W. Goodwin <i>et al.</i> , . . .	Adams and Whites Brooks, . . .	West Brookfield, . . .	1,800
Alfred Read <i>et al.</i> , . . .	Hollister and Little River Brooks, . . .	Westfield, . . .	2,000
Ira J. Humer, . . .	Whitin Street Brook, . . .	Holyoke, . . .	1,350
F. M. Smith <i>et al.</i> , . . .	Leaping Well Brook, . . .	South Hadley, . . .	1,350
E. G. Miller <i>et al.</i> , . . .	Parsons and Broad Brooks, . . .	Northampton, . . .	1,750
E. P. Bartlett <i>et al.</i> , . . .	Cook-Wedge and Buffum Brooks, . . .	Pelham, . . .	1,600
F. T. Slater, . . .	Alewife Brook, . . .	Gloucester, . . .	1,800
Isaac C. Day, . . .	Parter and Pearl Brooks, . . .	Boxford, . . .	900
David P. Waters <i>et al.</i> , . . .	Darlings Brook, . . .	Middleton, . . .	900
Isaac D. Pope, . . .	Crane River Brook, . . .	Danvers, . . .	900
E. A. Fuller <i>et al.</i> , . . .	Mosquito and Boston Brooks, . . .	North Andover, . . .	900
A. B. Robinson <i>et al.</i> , . . .	Walker Brook, . . .	Georgetown, . . .	900
Chas. A. Lunt <i>et al.</i> , . . .	Tanhouse and Batchelder Brooks, . . .	Rowley, . . .	900
Richard Taff <i>et al.</i> , . . .	Tyngsborough Brook, . . .	Tyngsborough, . . .	1,800
Claude H. Tarbox, . . .	Wheeler Brook, . . .	Byfield, . . .	900
Geo. I. Simpson, . . .	Brown Brook, . . .	Attleborough, . . .	1,000
F. B. Newton <i>et al.</i> , . . .	Barber and Coles Brooks, . . .	South Framingham, . . .	1,500
L. G. McKnight <i>et al.</i> , . . .	Cold Stream Brook, . . .	Gardner, . . .	1,500
Wm. H. Leonard, . . .	Rumford and Torreys Brooks, . . .	Foxborough, . . .	900
Homer King, . . .	Tatnuck and Kettle Brooks, . . .	Worcester, . . .	900
Chas. L. Allen, . . .	Barber Brook, . . .	Worcester, . . .	900
A. M. Taft, . . .	- . . .	Princeton, . . .	900
Henry A. Mower, . . .	Quinapoxet Brook, . . .	Holden, . . .	900
Harry A. Dickerman, . . .	Mechanics Brook, . . .	Attleborough, . . .	1,000
			65,000

Ponds stocked with White Perch, 1902.

[Section 19, Chapter 91, Revised Laws.]

Little Sandy Pond,	.	.	.	.	.	.	Pembroke.
Maquan Pond,	.	.	.	.	.	.	Hanson.
Milford Pond,	.	.	.	.	.	.	Swansea.
Scaddings Pond,	.	.	.	.	.	.	Taunton.
Winneconnet Lake,	.	.	.	.	.	.	Norton.
North Pond,	.	.	.	.	.	.	Orange.
Stiles Pond,	.	.	.	.	.	.	Boxford.
Dennis Pond,	.	.	.	.	.	.	Yarmouth.
Middle Pond,	.	.	.	.	.	.	Dana.

Ponds stocked with Rainbow Trout and Landlocked Salmon, 1902.

[Section 19, Chapter 91, Revised Laws.]

Onota Lake,	.	.	.	.	.	.	Pittsfield.
Cranberry Pond,	.	.	.	.	.	.	Spencer.
Hardwick Pond,	.	.	.	.	.	.	Ware.
Pentucket Pond,	.	.	.	.	.	.	Georgetown.
Rock Pond,	.	.	.	.	.	.	Georgetown.
Queen Lake,	.	.	.	.	.	.	Phillipston.
Whalom Lake,	.	.	.	.	.	.	Lunenburg.
Snows Pond,	.	.	.	.	.	.	Ware

NOTE — Landlocked salmon were put into only the first three ponds in this list, but all were stocked with rainbow trout fingerlings.

The following ponds were stocked with rainbow trout, but not closed : —

Long Pond,	.	.	.	.	.	.	Wellfleet.
Pocksha Pond,	.	.	.	.	.	.	Rock.

[C.]

DISTRIBUTION OF PHEASANTS.

Pheasants were liberated in the covers in various sections of the State, as indicated in the following list, which also embraces the names of applicants for birds:—

A. C. Stevens,	. . . . .	Worthington.
R. B. Chessman,	. . . . .	Abington.
E. P. Bartlett,	. . . . .	Pelham.
L. H. Warner,	. . . . .	Northampton.
Chas. A. Hall,	. . . . .	Ashfield.
F. N. Haskins,	. . . . .	Savoy.
North Attleborough Fish and Game Association,	. . . . .	North Attleborough.
C. H. Morse,	. . . . .	Petersham.
Tobias H. Burke,	. . . . .	West Quincy.
Henry Frost,	. . . . .	Haverhill.
Edward N. Ames,	. . . . .	Wilmington.
Chas. Spooner,	. . . . .	South Hadley and Granby.
P. P. Adams,	. . . . .	Waltham.
Abbott S. Mitchell,	. . . . .	Lexington.
E. J. S. Miller,	. . . . .	Concord.
Frank M. Chase,	. . . . .	Fall River.
Thos. B. Rounds,	. . . . .	Somerset.
Sanborn G. Tenney,	. . . . .	Williamstown.
J. D. Upton,	. . . . .	North Reading.
Arthur W. Beckford,	. . . . .	Danvers.
J. A. Pettigrew,	. . . . .	Jamaica Plain.
Thos. Stackhouse,	. . . . .	Marshfield Hills.
Selectmen,	. . . . .	Yarmouth.
George T. Wyer,	. . . . .	Wellfleet.
James E. Cadagon,	. . . . .	Adams.
William E. Hoyt,	. . . . .	Williamstown.
Edward Brooks,	. . . . .	Andover.
John W. Wheeler,	. . . . .	Orange.
Arthur E. Roberts,	. . . . .	Reading.
Marlborough Fish and Game Protective Association,	. . . . .	Marlborough.

Myles Standish,	Rock.
Rufus A. Soule,	New Bedford.
Thos. W. Williams,	Attleborough.
Geo. N. Smalley,	Carver.
John Kenrick,	South Orleans.
Uxbridge Fish and Game Association, .	Uxbridge.
David G. Welton,	Salem.
Geo. Pogue,	Grafton.
James H. Krum, Jr.,	North Adams.

[D.]

DISTRIBUTION OF BELGIAN HARES.

Belgian hares have been liberated in the covers, as indicated in the following list, in compliance with applications received from the persons whose names appear:—

David G. Welton,	Salem.
W. H. Toner,	Lakeville.
Rufus A. Soule,	New Bedford.
Shephard R. Dyer,	Plainfield.
H. E. Reynolds,	Braintree.
Wm. H. Leonard,	Foxborough.
Selectmen,	Yarmouth.
John H. P. Dodge,	Rock.
Winslow Clark,	Hopkinton.
P. H. Clairsey,	Dalton.
Charles Spooner,	Granby.
Selectmen,	Orleans.
Selectmen,	Falmouth.
Henry M. Knowles,	New Bedford.
F. R. Whitcher,	Amesbury.
J. W. Jackson,	Belchertown.
E. P. Bartlett,	Pelham.
Calvin D. Pratt,	Taunton.
Tobias H. Burke,	Quincy.
James E. Cadagon,	Adams.
Selectmen,	Sandwich.
Willard E. Hoyt,	Williamstown.
Thos. W. Williams,	Attleborough.
Brookside Hunt Club,	Lynn.
Marlborough Fish and Game Association,	Marlborough.
Michael Shea,	New Bedford.
George W. Fields,	Sharon.

[E.]

ARRESTS AND CONVICTIONS.

The following tabulated statement shows in detail the result of the enforcement of fish and game laws, so far as arrests and convictions are concerned. The total number of arrests was 157 and the aggregate of convictions was 138. Among those convicted, 1 appealed, 2 cases were continued for sentence, and 10 were put on file; 19 of the persons arrested were discharged. The total amount of fines was \$1,772.

Considered in detail, 57 arrests were made for Sunday hunting, 34 for illegal fishing, 20 for violation of the lobster laws, 10 for shooting song and insectivorous birds, 9 for illegal hunting not otherwise specified, 8 for using ferrets, 6 for hunting out of season, 4 for snaring, 3 for selling game out of season, 2 for offering partridge for sale and 1 for killing a deer; thus 103 arrests were made for violations of the game laws and 54 for violations of the fish laws.

Report upon Convictions, Fines, etc., for Violations of Fish and Game Laws.

STATE v. —	TOWN OR CITY.	Offence.	Court Decision.	Fine.
Alexander Campbell,	Essex, . . .	Short lobsters,	Convicted, . .	\$25 00
Daniel W. Spooner,	Dartmouth, . .	Snaring partridge,	Convicted, . .	20 00
Richard Littleton,	Taunton, . . .	Sunday hunting,	Discharged, . .	—
Sumner P. Ames,	West Bridgewater,	Sunday hunting,	Convicted, . .	5 00
George W. Wilbur,	Norton, . . .	Snaring partridge,	Convicted, . .	30 00
George W. Bran,	Salem, . . .	Illegal fishing,	Convicted, . .	10 00
Asa Galucia,	Lynn, . . .	Illegal fishing,	Convicted, . .	10 00
Charles Grobski,	Lynn, . . .	Illegal fishing,	Convicted, . .	4 00
Angelo Carboni,	Boston, . . .	Shooting song birds,	Convicted, . .	3 00
Benjamin M. Gould,	Middleton, . .	Shooting and illegal possession of game,	Convicted, . .	20 00
Generollo Fucillo,	Boston, . . .	Shooting song birds,	Convicted, . .	10 00
Augustus Pelletier,	Ayer, . . .	Snaring,	Convicted, . .	20 00
John C. Keiley,	Newton, . . .	Sunday hunting,	Convicted, . .	20 00
Henry Brown,	Walpole, . . .	Sunday hunting,	Convicted, . .	10 00
Edward Harriman,	Reading, . . .	Sunday hunting,	Convicted, . .	10 00
John T. Collins,	Malden, . . .	Killing deer,	Convicted, . .	100 00
Joseph Brigham,	Rhode Island,	Sunday hunting,	Convicted, . .	15 00
John McGuiness,	Rhode Island,	Sunday hunting,	Convicted, . .	15 00
Patrick Keith,	Rhode Island,	Sunday hunting,	Convicted, . .	15 00
Joseph Lowray,	Rhode Island,	Sunday hunting,	Convicted, . .	15 00
Ernest Phurin,	Rhode Island,	Sunday hunting,	Convicted, . .	15 00
Anthony Phurin,	Rhode Island,	Sunday hunting,	Convicted, . .	15 00
William H. Curtin,	Milford, . . .	Sunday hunting,	Convicted, . .	10 00
Edmond A. Vogel,	Hopedale, . .	Sunday hunting,	Convicted, . .	30 00
Avery Powell,	Chelsea, . . .	Short lobsters,	Convicted, . .	65 00
Ernest Bowman,	Rockport, . .	Short lobsters,	Discharged, . .	—
Clarence Smith,	Duxbury, . .	Short lobsters,	Convicted, . .	18 00

Walter E. Merryman,*	Revere, .	Short lobsters,	Discharged, .	-
Antone Sears, .	Boston, .	Short lobsters,	Convicted, .	10 00
Manuel Corey, .	Cambridge,	Short lobsters,	Convicted, .	10 00
Joseph Sears, .	Cambridge,	Short lobsters,	Convicted, .	10 00
John Travers, .	Cambridge,	Short lobsters,	Convicted, .	10 00
Clifford Locke,*	Winthrop,	Short lobsters,	Discharged, .	-
John Nelson, .	Boston, .	Short lobsters,	Convicted, .	17 00
Vincent Roggiere,	Boston, .	Short lobsters,	Convicted, .	20 00
Joseph E. Holbrook,	Lynn, .	Short lobsters,	Convicted, .	25 00
Charles N. Ryder,	Lynn, .	Short lobsters,	Convicted, .	5 00
John Nelson, .	Boston, .	Sunday hunting,	Convicted, .	7 00
Andrew Carlson,	Boston, .	Sunday hunting,	Convicted, .	7 00
Peter Jackson, .	Boston, .	Sunday hunting,	Convicted, .	10 00
Oliver R. Litchfield,	Boston, .	Sunday hunting,	Convicted, .	10 00
Andrew Swanson,	Boston, .	Sunday hunting,	On file.	
Lewis E. Moulton,	Beverly,	Short lobsters,	Convicted, .	10 00
William Hamilton,	Gloucester,	Mutilated lobsters,	Convicted, .	2 00
Frank E. Bickford,	Chelmsford,	Sunday hunting and illegal possession of game,	Convicted, .	31 00
Fred M. Brown,	Chelmsford,	Sunday hunting,	Convicted, .	10 00
John Quessy, .	Chelmsford,	Sunday hunting and illegal possession of game,	Convicted, .	21 00
Jesse Walsh,†	Rockport,	Sunday hunting,	Convicted, .	10 00
Victor Mullin, .	Ludlow,	Illegal fishing,	Discharged,	-
George Hartwell,	Springfield,	Illegal fishing,	Discharged,	-
John B. Brigham,	Palmer, .	Sunday hunting,	Convicted, .	On file.
Fred Ringe,‡	Wilbraham,	Illegal hunting,	Convicted, .	On file.

* In the cases of Walter E. Merryman and Clifford Locke, the two men were understood to be associated together in trade. Merryman was first arrested and tried, but was discharged, the court holding that he was not responsible. The court granted a warrant for Locke, whose case was continued. When the case finally came to trial, another judge presided, who discharged Locke.

† Complaint of Sunday hunting, placed on file; convicted for illegal killing of rabbits.

‡ A boy; case was filed, with full approval of commission.

Report upon Convictions, Fines, etc., for Violations of Fish and Game Laws — Continued.

STATE v. —	TOWN OR CITY.	Offence.	Court Decision.	Fine.
John Murphy, .	Springfield, .	Selling game out of season, .	Discharged, .	—
Herman Adaskin, .	Springfield, .	Selling game out of season, .	Discharged, .	—
A. P. Tourtelotte, .	Holyoke, .	Selling game out of season, .	Discharged, .	—
Frank Barnes,*	Belchertown, .	Fishing in closed pond, .	Convicted, .	\$20 00
Joseph LaFrance, .	Holyoke, .	Illegal fishing, .	Convicted, .	10 00
Joseph Smith, .	Holyoke, .	Illegal fishing, .	Convicted, .	10 00
Benjamin Babb, .	Southwick, .	Illegal fishing, .	Convicted, .	10 00
Mark Kempton, .	Palmer, .	Sunday hunting, .	Convicted, .	On file.
Adrian Miller, .	Palmer, .	Sunday hunting, .	Convicted, .	On file.
Walter Dean, .	Oakham, .	Illegal fishing, .	Convicted, .	5 00
Horace Merriam, .	Wales, .	Hunting out of season, .	Convicted, .	10 00
Camile Supreneau, .	Ludlow, .	Sunday hunting, .	Convicted, .	10 00
Alcide Mercure, .	Palmer, .	Hunting out of season, .	Convicted, .	10 00
Nicholas La Royné, .	Hudson, .	Hunting in close season, .	Convicted, .	On file.
Alvie Germane, .	Hardwick, .	Hunting out of season, .	Convicted, .	On file.
Fred Merrick, .	Grafton, .	Sunday hunting, .	Convicted, .	5 00
Joseph Czezwska, .	Hardwick, .	Sunday hunting, .	Convicted, .	10 00
Delore Magnon, .	Hardwick, .	Hunting with ferret, .	Convicted, .	20 00
Frank Brunelle, .	Hardwick, .	Hunting with ferret, .	Convicted, .	20 00
John Alvey, .	Ware, .	Snaring partridge, .	Discharged, .	—
Abel W. Carlson, .	Worcester, .	Illegal fishing, .	Convicted, .	10 00
Winfred Doane,†	Brookfield, .	Illegal fishing, .	Discharged, .	—
Edward Dumphrey,*	North Brookfield, .	Sunday hunting, .	Convicted, .	5 00
Herbert Caruth, .	Furnace, .	Sunday hunting, .	Convicted, .	5 00
Frank R. Marble, .	Barre, .	Sunday hunting, .	Discharged, .	—
Joseph S. Bugbee,‡	New Braintree, .	Offering partridge for sale, .	Convicted, .	20 00
Arthur Moore, .	Grafton, .	Sunday hunting, .	Convicted, .	5 00

Carl Landgrin,	Grafton,	Sunday hunting,	Convicted,	5 00
William A. Keil,	New Bedford,	Fishing on closed pond,	Convicted,	10 00
Peter Cossetta, §	Boston,	Shooting song birds, and trespass,	Convicted,	1 00
Lagona Rosario,	Boston,	Shooting song birds,	Convicted,	10 00
Wesley V. Ham,	Wrentham,	Sunday hunting,	Convicted,	1 00
Angelo Caldrono,	Lawrence,	Shooting song birds,	Convicted,	10 00
Charles W. Perry,	Providence, R. I.,	Shooting game out of season,	Convicted,	20 00
John de Angelo,	Boston,	Short lobsters,	Convicted,	15 00
Charles Briggs,	Pawtucket, R. I.,	Sunday hunting,	Convicted,	20 00
Daniel Linton,	Pawtucket, R. I.,	Sunday hunting,	Convicted,	20 00
George Mather,	Westminster,	Sunday hunting,	Convicted,	10 00
James Mather,	Westminster,	Sunday hunting,	Convicted,	10 00
Fred R. Newell,	Westminster,	Sunday hunting,	Convicted,	15 00
A W. Field,	Fitchburg,	Short trout,	Convicted,	10 00
H. F. Boutwell,	Westminster,	Short trout,	Convicted,	10 00
Clayton Morse,	Westminster,	Short trout,	Convicted,	10 00
Antino Barrone,	Boston,	Shooting out of season,	Convicted,	10 00
Charles Gilliga,	Easthampton,	Illegal hunting,	Discharged,	-
Gotwald Herzig,	Uxbridge,	Sunday hunting,	Convicted,	10 00
C. I. Jones,	Uxbridge,	Sunday hunting,	Convicted,	10 00
J. F. Jones,	Uxbridge,	Sunday hunting,	Convicted,	10 00
Charles H. Roxbee,	Stoneham,	Sunday hunting,	Convicted,	1 00
Harry B. McWade,	Woburn,	Sunday hunting,	Convicted,	1 00
Charles E. Kenney,	Woburn,	Sunday hunting,	Convicted,	1 00
Martin Wawryzniak,	Webster,	Illegal fishing,	Convicted,	10 00
William Wawryzniak,	Webster,	Illegal fishing,	Convicted,	10 00

* Appealed.

† In this case the court held that the pond in which Doane was fishing had not been closed by the Fish and Game Commission.

‡ In the case of Joseph S. Bugbee the court convicted him on one partridge, and the case on twelve additional partridge was continued for sentence.

§ Charge for shooting song birds was put on file.

Report upon Convictions, Fines, etc., for Violations of Fish and Game Laws — Concluded.

STATE v. —	TOWN OR CITY.	Offence.	Court Decision.	Fine.
James Byron.*	North Attleborough,	Sunday hunting and ferreting,	Convicted,	\$10 00
Frank McCracken,*	North Attleborough,	Sunday hunting and ferreting,	Convicted,	10 00
Hugo Newhouse,*	North Attleborough,	Sunday hunting and ferreting,	Convicted,	10 00
George F. Adams,	Lowell,	Ferreting,	Discharged,	—
Frank I. Henry,	Lowell,	Ferreting,	Discharged,	—
Fred Hall,	Lowell,	Ferreting and illegal possession of game,	Convicted,	20 00
Ralph L. Holmes,	Beverly,	Illegal fishing,	Convicted,	On file.
William S. Pike, Jr.,	Beverly,	Illegal fishing,	Convicted,	On file.
M. J. Luehia,	Lynn,	Illegal fishing,	Convicted,	On file.
Leon Holcomb,	Longmeadow,	Shooting song birds,	Convicted,	30 00
Genaro Albano,	Agawam,	Shooting song birds,	Convicted,	10 00
Louis Albano,	Agawam,	Shooting song birds,	Convicted,	10 00
Guiseppe Longo,	Agawam,	Shooting song birds,	Convicted,	10 00
John Caldaroni,	Lawrence,	Shooting song birds,	Convicted,	10 00
Michael Joseph,	Lawrence,	Illegal hunting,	Convicted,	20 00
Abraham Joseph,	Lawrence,	Illegal fishing,	Convicted,	10 00
Salem Bethenani,	Lawrence,	Illegal fishing,	Convicted,	10 00
George Michael,	Lawrence,	Illegal fishing,	Convicted,	10 00
Thomas Murphy,†	Lawrence,	Illegal fishing,	Convicted,	10 00
John Sheminiskey,	Lawrence,	Illegal fishing,	Convicted,	10 00
August Pasgarle,	Lawrence,	Sunday hunting,	Convicted,	—
Seointe Rocco,	Lawrence,	Shooting song birds,	Convicted,	10 00
Bedwa Petero,	Lawrence,	Shooting song birds,	Convicted,	10 00
Joseph Berube,	Methuen,	Illegal hunting,	Convicted,	10 00
Albert Gerard,	Methuen,	Illegal hunting,	Convicted,	30 00
Alexander Demarcus,	Ipswich,	Illegal hunting,	Convicted,	10 00
Alexander Demarcus,	Ipswich,	Illegal hunting,	Convicted,	20 00
		Illegal hunting,	Discharged,	—

Theodore Gedo,	Northampton,	Illegal fishing,	Convicted,	25 00
Albert Flanders,	Marshfield,	Short lobsters,	Convicted,	6 00
Albert Lewis,	Seituate,	Short lobsters,	Convicted,	25 00
D. T. Ward,	Seituate,	Short lobsters,	Convicted,	25 00
Samuel Babbitt,	Hull,	Short lobsters,	Convicted,	20 00
John David,†	Holden,	Illegal fishing,	Discharged,	-
William Allen,†	Holden,	Illegal fishing,	Discharged,	-
Fred Gray,†	Holden,	Illegal fishing,	Convicted,	10 00
Willard T. Austin,	Holden,	Illegal fishing,	Convicted,	10 00
Benjamin Socine,	Pittsfield,	Illegal fishing,	Convicted,	10 00
Fred. Champlin,†	North Adams,	Shooting song birds,	Convicted,	10 00
Henry Lumbau,	East Longmeadow,	Snaring,	Convicted,	-
Henry L. Damon,	North Adams,	Hunting in closed season,	Convicted,	1 00
Leslie W. Fuller,	Chesterfield,	Sunday hunting,	Convicted,	10 00
Warren H. Whitmore,	Athol,	Sunday hunting,	Convicted,	10 00
Fred. Morse,	Royalston,	Sunday hunting,	Convicted,	10 00
Lewis Smith,	Royalston,	Sunday hunting,	Convicted,	10 00
Joseph Wojcik,	Athol,	Sunday hunting,	Convicted,	10 00
Edwin R. Smith,	Adams,	Sunday hunting,	Convicted,	5 00
Harry Miller,	Williamstown,	Sunday hunting,	Convicted,	5 00
William Ellis,	Monterey,	Sunday hunting,	Convicted,	10 00
F. Mackintire,	Ipswich,	Offering partridge for sale,	Convicted,	100 00
T. Burnham,	Ipswich,	Illegal fishing,	Convicted,	15 00
J. H. Burnham,	Ipswich,	Illegal fishing,	Convicted,	10 00
A. Burnham,	Ipswich,	Illegal fishing,	Convicted,	15 00
		Illegal fishing,	Convicted,	15 00

* In each of these cases the parties were convicted on the charge of Sunday hunting, and were discharged on the charge of having a ferret in possession.

† Case continued for sentence.

‡ These parties were arrested for illegal fishing in Eagle Lake, Holden; but the court declined to grant a warrant for them, because of the appeal of the selectmen of Holden, on the ground that the town was too poor to stand the expense if the parties should be convicted.

[F.]

LEGISLATION.

Acts of 1902.

[CHAPTER 138.]

AN ACT TO TRANSFER THE POWERS AND DUTIES OF THE INSPECTOR GENERAL OF FISH TO THE BOARD OF COMMISSIONERS ON FISHERIES AND GAME.

Be it enacted, etc., as follows:

SECTION 1. The office of inspector general of fish is hereby abolished.

SECTION 2. The powers and duties heretofore conferred and imposed upon the inspector general of fish are hereby conferred and imposed upon the board of commissioners on fisheries and game.

SECTION 3. Said board may appoint in every town in which fish is packed for export, inspectors of fish, who shall be sworn before them or before a justice of the peace, and shall give bond to them with sufficient sureties, and be removable at the discretion of said board. Each inspector shall once in six months make the returns to said board necessary to carry into effect the provisions of chapter fifty-six of the Revised Laws.

SECTION 4. The inspectors of fish shall have the powers and perform the duties heretofore conferred and imposed upon the deputy inspectors of fish, but shall pay to the commissioners on fisheries and game the proportion of fees formerly paid to the inspector general of fish. Said commissioners shall pay the fees received from the inspectors into the treasury of the Commonwealth on the first Monday of January and the first Monday of July in each year, and shall include a brief statement of the work of fish inspection, and of the fees received therefor, in their annual report.

SECTION 5. Sections three and four of chapter fifty-six of the Revised Laws are hereby repealed. [*Approved February 27, 1902.*]

[CHAPTER 94.]

AN ACT TO REGULATE THE TAKING OF SHELLFISH IN THE TOWN OF
MARION.

Be it enacted, etc., as follows :

SECTION 1. It shall be unlawful to take or catch any oysters from or in the waters of Blankinships or Plantain island coves in the town of Marion, or to use a dredge or a drag net in said waters for any purpose, before the first day of September in the year nineteen hundred and four.

SECTION 2. Whoever violates any provision of this act shall be punished by a fine not exceeding twenty dollars for each offence.
[Approved February 20, 1902.]

[CHAPTER 164.]

AN ACT TO AUTHORIZE THE BOARD OF COMMISSIONERS ON FISHERIES
AND GAME TO ISSUE PERMITS FOR TAKING SAND EELS IN THE MERRI-
MAC AND IPSWICH RIVERS AND IN PLUM ISLAND SOUND.

Be it enacted, etc., as follows :

SECTION 1. Chapter ninety-one of the Revised Laws is hereby amended by striking out section seven and inserting in place thereof the following : — *Section 7.* The board of commissioners on fisheries and game may issue permits for the taking of sand eels in the tidal waters of the Merrimac and Ipswich rivers and Plum Island sound, and their tributaries. Said permits shall be issued without any fee therefor, and shall be revocable at the discretion of the commissioners.

SECTION 2. This act shall take effect upon its passage. [Approved March 12, 1902.]

[CHAPTER 178.]

AN ACT TO AUTHORIZE THE BOARD OF COMMISSIONERS ON FISHERIES AND
GAME TO MAKE CERTAIN INVESTIGATIONS.

Be it enacted, etc., as follows :

SECTION 1. The authority of the commissioners on fisheries and game shall extend to the investigation of questions relating to fish and fisheries, or to game, and they may from time to time, personally or by assistants, institute and conduct inquiries pertaining to such questions.

SECTION 2. This act shall take effect upon its passage. [Approved March 12, 1902.]

[CHAPTER 283.]

AN ACT TO AUTHORIZE THE LEASING OF FARM POND IN THE TOWN OF COTTAGE CITY BY THE COMMISSIONERS ON FISHERIES AND GAME.

Be it enacted, etc., as follows:

SECTION 1. The commissioners on fisheries and game, or any two of them, may in the name of the Commonwealth lease, for a term not exceeding eleven years, the pond known as Farm pond, in the town of Cottage City in the county of Dukes County, with the arms, coves and bays connected therewith, for the purpose of cultivating useful fishes, for such periods of time and on such terms and conditions as may seem to them most for the public good: *provided*, that nothing herein shall affect the right of any citizen of the Commonwealth to take fish in said pond or in the waters connected therewith, by hook and line, according to the laws now or hereafter in force relating to the taking of fish by hook and line.

SECTION 2. Before making such lease the commissioners shall appoint a time and place for a hearing upon the application therefor, and shall give notice of the hearing to every town within the limits of which any part of said pond lies.

SECTION 3. The commissioners may fix the limits of the said pond and of the arms, coves and bays connected therewith; which limits, being recorded in the registry of deeds for said county, shall be taken to be the legal limits thereof for all the purposes of this act.

SECTION 4. The commissioners shall have the custody of all such leases, and may cause any agreements, rights, reservations, forfeitures and conditions therein contained to be enforced, and for that purpose may institute proceedings in the name of the Commonwealth, and may take possession of any premises for breach of condition of such lease, and after revesting the Commonwealth therewith may again lease the same.

SECTION 5. This act shall take effect upon its passage. [*Approved April 8, 1902.*]

[CHAPTER 85.]

AN ACT TO FORBID QUAIL SHOOTING ON THE ISLAND OF NANTUCKET FOR A PERIOD OF THREE YEARS.

Be it enacted, etc., as follows:

SECTION 1. It shall be unlawful to take, kill or have in possession any quail on the island of Nantucket at any time within three years after the first day of March in the year nineteen hundred and two.

SECTION 2. Whoever violates any provision of this act shall be punished by a fine of twenty dollars for every quail taken, killed or had in possession contrary to the provisions hereof. [*Approved February 12, 1902.*]

[CHAPTER 137.]

AN ACT TO ESTABLISH THE OPEN SEASON FOR TROUT, LAND LOCKED SALMON AND LAKE TROUT IN THE COUNTIES OF BERKSHIRE, FRANKLIN, HAMPDEN AND HAMPSHIRE.

Be it enacted, etc., as follows:

Section sixty-three of chapter ninety-one of the Revised Laws is hereby amended by striking out the words "first day of August", in the fifth and sixth lines, and inserting in place thereof the words: — fifteenth day of July, — and by striking out the word "first", in the sixth line, and inserting in place thereof the word: — fifteenth, — so as to read as follows: — *Section 63.* Whoever, except as provided in section sixty-six, sells or offers or exposes for sale, or has in his possession, a trout, land locked salmon or lake trout, except alive, between the first day of September and the first day of April, or in the counties of Berkshire, Franklin, Hampden and Hampshire, between the fifteenth day of July and the fifteenth day of April, shall forfeit not less than ten nor more than twenty-five dollars for each offence; and the possession of any such fish between said dates shall be prima facie evidence to convict. [*Approved February 27, 1902.*]

[CHAPTER 165.]

AN ACT RELATIVE TO THE PROTECTION AND SALE OF QUAIL IN THE COUNTY OF BRISTOL.

Be it enacted, etc., as follows:

SECTION 1. Section three of chapter ninety-two of the Revised Laws is hereby amended by inserting after the word "following", in the third line, the words: — or, in the county of Bristol, between the fifteenth day of December and the first day of November following, — and by inserting after the word "May", in the ninth line, the words: — except that, in the county of Bristol, this period shall be from the fifteenth day of December to the first day of May, — so as to read as follows: — *Section 3.* Whoever takes, kills or has in possession, or buys, sells or offers for sale a quail, between the first day of December and the first day of October following, or, in the county of Bristol, between the fifteenth day of December and the first day of November following, whenever or wherever such bird

may have been taken or killed, shall be punished by a fine of twenty dollars for each bird; but a person, firm or corporation dealing in game or engaged in the cold storage business may buy, sell or have in possession, and a person may buy from such person, firm or corporation, and have in possession if so bought, quail from the first day of December to the first day of May, except that, in the county of Bristol, this period shall be from the fifteenth day of December to the first day of May, if such quail were not taken or killed in this Commonwealth contrary to the provisions of this chapter; and a person, firm or corporation dealing in game or engaged in the cold storage business may have quail in possession on cold storage at any season, if such quail were not taken or killed in this Commonwealth contrary to the provisions of this chapter.

SECTION 2. This act shall take effect upon its passage. [*Approved March 12, 1902.*]

[CHAPTER 236.]

AN ACT TO PROVIDE FOR THE BETTER PROTECTION OF GAME.

Be it enacted, etc., as follows:

SECTION 1. Whoever, except as provided in section twenty-one of chapter ninety-two of the Revised Laws, takes or sends or causes to be taken or sent out of the Commonwealth any bird or animal protected by the provisions of said chapter which has illegally been taken or killed within the Commonwealth; and whoever has in possession any such bird or animal with intent to take or send the same or to cause the same to be taken or sent out of the Commonwealth, shall be punished by a fine of twenty dollars for every bird or animal so had in possession or taken or sent beyond the limits of the Commonwealth.

SECTION 2. Section twenty-two of chapter ninety-two of the Revised Laws is hereby repealed. [*Approved March 27, 1902.*]

[CHAPTER 544.]

AN ACT TO AMEND THE REVISED LAWS AND TO SUPPLY CERTAIN OMISSIONS THEREFROM.

SECTION 11. Section sixty-four of chapter ninety-one of the Revised Laws is hereby amended by inserting after the words "apply to", in the seventh line, the words:—the county of Berkshire nor to, — so as to read as follows:—*Section 64.* Whoever at any time takes, catches or has in possession, or whoever sells or offers or

exposes for sale in this Commonwealth, trout less than six inches in length shall forfeit ten dollars for each such trout taken, caught, held in possession, sold or offered or exposed for sale; but the provisions of this section shall not affect the provisions of section twenty-eight, nor shall they apply to the county of Berkshire nor to a person who is engaged in breeding or rearing trout or to any person who, upon taking such trout, immediately returns it alive to the water from which it was taken. [*Approved June 28, 1902.*]

[G.]

STATISTICS.

The following tables show in detail, by counties, the statistics of the shore net and lobster fisheries of Massachusetts for the year ending Oct. 1, 1902, as reported to this commission. These tables embrace the fisheries with pound nets, weirs, floating fish traps, fyke nets, seines, gill nets and pots, the latter being used for catching lobsters. They do not, however, because of limitation of law, include other branches of the shore fisheries, and therefore lack completeness to that extent.

Table No. 1 shows the number of fishermen employed in the various sea-bordering countries in the fisheries designated. The table shows an increase of 121 in the persons employed, as compared with 1901. This increase is most noticeable in Essex, Suffolk and Plymouth counties. In Norfolk County there is a decrease of nearly 60 per cent., and in Barnstable County of 2 persons. Barnstable County employs about 40 per cent. of the fishermen enumerated in this table.

Table No. 2 shows, by counties, the number and value of boats and the number and value of the different forms of apparatus. It will be seen that 935 boats, with a value of \$107,993.50, were employed in these fisheries in 1902; also 155 pound nets and trap nets, worth \$94,230; 2,676 seines, gill nets, etc., valued at \$25,215.50; 20,058 lobster pots, worth \$24,890.05; and shore property and accessory apparatus, with a value of \$23,663.35. The total investment of the State in these branches of fishery is \$275,992.40. This is an excess over 1901 of \$46,129.80. Considered in detail, the following changes are shown between 1901 and 1902: there has been an increase of 105 boats, with an additional valuation of \$23,513.75; a decrease in pound nets and trap nets of 38, but an increase in value of \$2,625; an increase in seines, nets, etc., of 700, with an added valuation of \$6,322; an increase of 3,300 lobster pots, with an enhanced valuation

of \$3,276,60; and an advanced valuation of shore property, etc., of \$10,392.45.*

Table No. 3 shows, by counties and by species, the quantities and values of products. These aggregate 17,587,467 pounds, with a value, at the prices paid the fishermen, of \$355,449.41. Barnstable County leads, with a yield of 10,378,376 pounds, worth \$135,357.39; Essex County, which is next in productiveness, had 3,415,233 pounds of products, valued at \$68,675.20. In the preparation of this table the weight of lobsters was estimated; the actual number of lobsters was 670,245.

Comparing these returns with those of 1901, there is an increase of 3,423,218 pounds of products and \$41,406.14 in value.

TABLE NO. 1. — *Showing, by Counties, the Number of Men employed in the Shore Net and Lobster Fisheries of Massachusetts in 1902.*

COUNTIES.	Number.	COUNTIES.	Number.
Essex,	169	Nantucket,	33
Suffolk,	36	Dukes,	115
Norfolk,	6	Bristol,	84
Plymouth,	173	Total,	1,024
Barnstable,	408		

TABLE NO. 2. — *Showing, by Counties, the Apparatus employed in the Shore Net and Lobster Fisheries of Massachusetts in 1902.*

DESIGNATION.	ESSEX.		SUFFOLK.		NORFOLK.	
	Number.	Value.	Number.	Value.	Number.	Value.
Boats,	167	\$17,093 00	57	\$2,218 00	9	\$1,255 00
Pound nets and trap nets, . .	21	9,075 00	—	—	—	—
Seines, gill nets and fyke nets, .	225	3,380 00	—	—	—	—
Pots,†	4,840	5,484 95	3,317	3,735 50	307	402 00
Shore property and accessory apparatus,	—	2,305 20	—	410 65	—	118 65
Totals,	—	\$37,338 15	—	\$6,364 15	—	\$1,775 65

* It is probable that much of the increase noted is due rather to more complete returns than were ever previously received than to any actual advance in number and valuation of various forms of apparatus.

A better understanding on the part of the fishermen of the requirements of the law, and increased confidence that the information they transmit will be considered confidential, so far as individual returns are concerned, accounts in part at least for more correct data being received.

† Only lobster pots are included in the classification of "pots."

TABLE NO. 2. — *Apparatus employed, etc.* — Concluded.

DESIGNATION.	PLYMOUTH.		BARNSTABLE.		NANTUCKET.	
	Number.	Value	Number.	Value.	Number.	Value.
Boats,	194	\$16,013 00	323	\$45,778 50	32	\$7,012 00
Pound nets and trap nets, .	2	65 00	80	68,920 00	1	200 00
Seines, gill nets and fyke nets,	94	797 50	2,031	14,783 00	212	3,365 00
Pots,*	8,378	11,945 45	1,117	1,222 75	282	263 40
Shore property and accessory apparatus,	-	1,177 35	-	13,440 00	-	684 00
Totals,	-	\$29,998 30	-	\$144,144 25	-	\$11,524 40

DESIGNATION.	DUKES.		BRISTOL.		TOTALS.	
	Number.	Value.	Number.	Value.	Number.	Value.
Boats,	124	\$15,424 00	29	\$3,200 00	935	\$107,993 50
Pound nets and trap nets, .	50	15,950 00	1	20 00	155	94,230 00
Seines, gill nets and fyke nets,	92	1,280 00	22	1,610 00	2,676	25,215 50
Pots,*	1,537	1,578 50	280	257 50	20,058	24,890 05
Shore property and accessory apparatus,	-	2,773 00	-	2,754 50	-	23,663 35
Totals,	-	\$37,005 50	-	\$7,842 00	-	\$275,992 40

TABLE NO. 3. — *Showing, by Counties and Species, the Yield of the Shore Net and Lobster Fisheries of Massachusetts in 1902.*

SPECIES.	ESSEX.		SUFFOLK.		NORFOLK.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Alewives,	57,250	\$1,015 75	-	-	-	-
Bluefish,	50	2 50	-	-	-	-
Flounders and flatfish, .	337	3 47	-	-	-	-
Mackerel,	47,525	3,644 51	-	-	-	-
Menhaden,	24,111	125 07	-	-	-	-
Pollock,	375,623	2,453 66	-	-	-	-
Salmon,	10	2 00	-	-	-	-
Scup,	180	9 15	-	-	-	-
Sea bass,	-	-	-	-	-	-
Sea herring,	1,943,417	24,113 82	-	-	-	-
Shad,	1,450	42 26	-	-	-	-
Squeteague,	-	-	-	-	-	-
Striped bass,	76	12 10	-	-	-	-
Squid,	5,815	62 10	-	-	-	-
Tautog,	268	4 38	-	-	-	-
Other edible or bait species,	680,105	6,011 38	-	-	-	-
Refuse fish,	-	-	-	-	-	-
Lobsters,	279,016	31,173 05	163,426	\$17,694 02	12,577	\$1,620 19
Oil,	-	-	-	-	-	-
Totals,	3,415,233	\$68,675 20	163,426	\$17,694 02	12,577	\$1,620 19

* Only lobster pots are included in the classification of "pots."

TABLE No. 3.— *Yield of the Shore Net and Lobster Fisheries—Concluded.*

SPECIES.	PLYMOUTH.		BARNSTABLE.		NANTUCKET.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Alewives,	103,540	\$418 50	812,616	\$7,771 01	-	-
Bluefish,	-	-	24,220	1,923 80	113,445	\$9,020 12
Flounders and flatfish, . .	-	-	760,278	15,489 29	4,583	137 49
Mackerel,	13,477	1,350 68	531,551	28,228 26	66,897	3,774 12
Menhaden,	13,100	94 00	71,346	671 07	-	-
Pollock,	2,675	33 00	548,418	4,352 20	50,400	1,008 00
Salmon,	-	-	56	11 20	-	-
Scup,	-	-	4,354	148 12	6,414	192 42
Sea bass,	-	-	548	13 59	-	-
Sea herring,	5,000	99 00	2,451,404	23,847 34	4,500	37 00
Shad,	-	-	5,263	253 38	-	-
Squeteague,	15	75	716,184	15,540 45	1,511	22 15
Striped bass,	-	-	2,627	354 18	20	2 00
Squid,	125	62	3,710,635	21,212 66	13	39
Tautog,	-	-	20,876	416 73	45	90
Other edible or bait species,	6,680	224 50	652,197	9,349 06	14,960	495 70
Refuse fish,	-	-	32,553	279 94	-	-
Lobsters,	466,949	47,699 37	33,250	5,490 11	5,048	1,130 47
Oil,	-	-	-	-	-	-
Totals,	611,561	\$49,920 42	10,378,376	\$135,357 39	267,836	\$15,820 76

SPECIES.	DUKES.		BRISTOL.		TOTAL FOR STATE.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Alewives,	25,100	\$184 00	547,807	\$5,485 63	1,546,313	\$14,874 89
Bluefish,	1,779	123 27	-	-	139,494	11,079 69
Flounders and flatfish, . .	68,718	1,635 38	-	-	833,916	17,265 63
Mackerel,	73,095	2,771 79	-	-	732,545	39,769 36
Menhaden,	2,000	11 50	-	-	110,557	901 64
Pollock,	72,300	703 00	-	-	1,049,416	8,549 86
Salmon,	-	-	-	-	66	13 20
Scup,	165,195	3,883 21	-	-	176,143	4,287 90
Sea bass,	14,203	681 26	-	-	14,751	694 85
Sea herring,	3,700	95 00	-	-	4,408,021	48,192 16
Shad,	241	34 85	12,564	696 60	19,518	1,027 09
Squeteague,	1,600,519	42,162 90	-	-	2,318,229	57,726 25
Striped bass,	2	30	-	-	2,725	368 58
Squid,	10,950	111 50	-	-	3,727,538	21,387 27
Tautog,	4,040	117 15	-	-	25,229	539 16
Other edible or bait species,	86,674	2,521 90	3,070	203 05	1,443,686	18,805 59
Refuse fish,	1,400	11 00	-	-	33,953	290 94
Lobsters,	40,332	4,206 65	4,769	711 49	1,005,367	109,725 35
Oil,	-	-	-	-	-	-
Totals,	2,170,248	\$59,264 66	568,210	\$7,096 77	17,537,467	\$355,449 41



STATE HATCHERY, SUTTON, MASS.

REPORT
OF THE
COMMISSIONERS
ON
FISHERIES AND GAME
FOR THE
YEAR ENDING DECEMBER 31, 1903.



BOSTON:
WRIGHT & POTTER PRINTING CO., STATE PRINTERS,
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CONTENTS.

REPORT.

General considerations : —	PAGE
Appropriations,	5
Expansion of the work,	6
Fish culture : —	
Appropriation,	10
Expansion,	11
Output of fish,	13
Method of distribution,	14
Work at the hatcheries,	18
Ponds stocked,	28
Brooks stocked and closed,	32
Rivers stocked,	32
Examination of ponds,	32
Work of the United States Fish Commission,	47
Fishways ; need of legislation,	50
Prevention of stream pollution,	53
Death of fish because of supposed pollution,	56
Preliminary report upon death of alewives, etc.,	58
Pond and brook fishing,	60
Fisheries : —	
Notable features of the year,	75
Shore weir and net fisheries,	84
Clams,	90
Lobster culture and lobster fishing,	91
Sea fisheries,	97
Inspection of fish,	133
Game : —	
How the hunting of game may benefit the State,	133
Need of protective legislation,	138
Status of game,	145
Sea and shore birds,	149
Partridge, woodcock and quail,	152
The wild pidgeon,	159
Pheasants,	159
Song and insectivorous birds,	163
Deer,	165
The Belgian hare,	168
Rabbits and squirrels,	169

Breeding game birds and animals:—	PAGE
Winchester,	172
Pheasants,	172
Experiments in hatching eggs,	173
Crossing pheasants,	176
The Belgian hare,	176
Sutton,	177
Report of superintendent,	177
Experiments elsewhere,	181
Distribution of game birds and animals,	183
Enforcement of law:—	
Financial resources,	184
Force employed,	185
System adopted,	186
The launch "Scoter,"	189
The work,	192
New legislation,	204
Courtesies,	207

APPENDIX.

A. List of commissioners,	211
B. Distribution of food fish,	217
Brook trout fry distribution,	217
Fingerling brook trout planted,	219
Ponds stocked, etc.,	222
Brooks and rivers stocked and closed,	223
C. Distribution of pheasants,	224
D. Distribution of Belgian hares,	226
E. Arrests and convictions,	227
F. Legislation of the year,	235
G. Statistics of shore fisheries,	244

Commonwealth of Massachusetts.

To His Excellency the Governor and Honorable Council.

The Commissioners on Fisheries and Game respectfully submit their thirty-eighth annual report.

GENERAL CONSIDERATIONS.

Appropriations. — The aggregate sum appropriated for the conduct of the various branches of the commission's work during the current year was \$27,555. The details of the disbursement of this money will be comprehensively shown in the report of the Auditor of the Commonwealth, to which reference is made for these particulars.

The appropriations were divided by law as follows: \$5,630 for compensation of the commissioners; \$1,550 for travel and other necessary expenses of the commissioners; \$780 for clerical services; \$18,445 for enforcement of laws, the propagation and distribution of fish, birds and animals, and for running expenses, rent and maintenance of hatcheries; \$500 for stocking ponds; \$300 for stocking brooks under special act; and \$350 for printing the annual report.

A special act was passed granting \$200 to defray any expenses that might arise in consequence of a convention of commissioners of lobster-producing States and British provinces.

The slight increase from last year in the larger item of the appropriation is due to the consideration given to the representations of the commission as to the need of a swift launch for the enforcement of the fish and game laws along the coast, and the greater economy for the State to own such a craft, instead of chartering it at an annual outlay amounting to a considerable percentage of the cost.

The generous treatment given by the Legislature to the recommendations of the commission in the matter of appropria-

tions is highly satisfactory ; it evidences a continuous growth of interest in the work, and a confidence in the proper and economic utilization of public money placed in our charge. It is true that all expenditures have been watched with care, and every effort has been made to secure the largest return for money expended ; but this is only plain duty, and any consideration accorded because of it, if such is the case, should be credited to the generosity of those concerned, or to a wider recognition of public needs. However this may be, it is the ambition of the commission to secure the largest results in the public interest for the outlay made. It is believed this has been accomplished without exception, and that reason exists for satisfaction, not only with the general success of the year, but also because each step onward serves as a foundation for greater advance in future where progress is needed, and to that extent has a larger value than any isolated effort can possess. This will be more clearly apparent if attention is given to chapters containing details of the work.

Expansion of the Work.—As heretofore, everything possible has been done to expand the work in various directions. As a rule, success has attended the effort ; in a few cases natural causes, which were insurmountable, have prevented the attainment of certain results that otherwise could easily have been secured. Elsewhere detailed statements will show that there has been an improvement in the fish distributed by the commission, although there was a falling off in the number of shad planted, due to unpreventable cause. In the matter of rearing fingerlings a record has been made. Improvement in the hatching stations still continues ; in many ways they have been made better for the accomplishment of the results required of them.

The breeding of pheasants has been prosecuted with a success never previously attained ; additional facilities have been provided, and studies have been prosecuted that we hope may prove useful, not alone to this work, but to many of our citizens engaged in poultry breeding. Interesting experiments in breeding birds have been instituted ; the results of these are such that the effect on the public welfare may have a value far beyond the entire amount expended in breeding pheasants.

Attempts to breed game birds have continued; details of experiments will be found elsewhere.

The statistical effort prosecuted by the commission in accordance with law is better understood by the fishermen than before, and they are gradually learning that it is to their own advantage to furnish the information required from them by the State.

The effect of laws now on the statute books has been to cause the entire abandonment of official inspection of fish in this State. Whether it will be resumed in the future is a matter of conjecture, but there seems no reason now to expect resumption while present laws remain.

The building of a naphtha launch, from a special design, for patrolling the coast to secure the better enforcement of fish and game laws, is one of the most important steps taken by the commission in a long time, and marks an epoch in its progress. A few boats of this kind, the cost of which would be only a fraction of the cost of a steam vessel of the size formerly utilized by the commission, could patrol the entire coast line of the State so effectively that the laws now in force would have larger significance than they have had. For the enforcement of laws along the coast nothing can surpass in effectiveness a swift, seaworthy launch, on which men can cruise and live, so that they are not dependent upon hotels or upon reaching particular harbors where accommodations are procurable. When safety, speed, comfort and more or less untrammelled freedom of action can be secured at comparatively small expense, much has been gained, and the work has been placed in a notably progressive position.

There has been no diminution in the very satisfactory relations existing between scientists and scientific institutions and the commission. Whatever we could do to aid them we were glad to do, and in some instances the commission has received important voluntary aid from them in return.

The convention of commissioners of the lobster-producing States and delegates from Canada was one of the most important events of the year. A consideration by such a body of distinguished men of the best means to preserve the lobster from further decimation was a matter of large consequence.

But the inauguration of such a convention, whereby the knowledge and experience of many could be focussed on the accomplishment of an object, is a matter of importance, for it points the way to other similar meetings, through which the public good may be promoted in matters relating to fisheries and game. The Commonwealth has just cause for gratification that it led in this endeavor to secure action which must have a widespread beneficial effect.

While natural causes, notably the failure of the sardine to approach the coast of France in its usual abundance, have had a bad effect on particular branches of our fish trade abroad, still, a correspondence has been kept up with residents of other countries, in order that our fishing interests might be apprised if any information favorable to them was obtained.

The field work, such as the examination of ponds, brooks and saw-mills, has never heretofore been so extensively prosecuted.

The effort to add to the collection of material illustrating the work of the commission has continued, and several interesting specimens have been obtained. The present utter lack of space for the installation of such a collection, necessary though it may be to an extent not easily understood by one unfamiliar with the work, makes further progress practically impossible, and nullifies the good intentions of those who otherwise might contribute to the collection. It may yet be possible to accommodate a specimen here and there, but nothing beyond that can be attempted with present limited accommodations.

Additions have been made to the reference library, but in this case, too, the limit of present accommodations has been reached, and little more can be done until it is possible to find space for books. This is regrettable, for the need of a collection of books on special topics is too apparent to admit of discussion.

In other respects the expansion of the work of the commission, in consequence of public demands, has been such that it is no longer possible to find satisfactory accommodations in one small room. When the records of each year as it passes must be taken to Winchester for storage in the hatchery, where they are beyond easy reach for reference and liable to be destroyed,

and when much of the work of the office must be done elsewhere, where privacy can be assured, it is unnecessary to say that a condition exists that ought not to continue longer. With only one room, to which every one has access, it is generally difficult and sometimes impossible to carry on the large amount of work that must be done; at the best the work must be done (if done in the office) in the face of great obstacles, and frequently at a sacrifice of personal comfort and strength. So excessive has the strain become that the chairman has been compelled to provide himself with quarters elsewhere, where a portion of the day can be spent in attending to those duties which can be best performed when free from constant interruption.

The increasing demands upon the commission for information and service evince a most satisfactory development of confidence in its ability to supply knowledge that is more or less closely associated with its functions, and also to meet any requirements upon it for material or action that may be made, providing, of course, they are within the scope of its effort. Sometimes requests for information not directly connected with our work have been received, and some have wished certain questions solved which we were not prepared to answer, because of lack of the men and material to deal with intricate scientific problems. However, through the courtesy of generous-minded scientists we have been able to supply the required information, and there is gratification in knowing that the public has thus been well served.

The demand for documents issued by the commission, especially those containing laws, has reached large proportions. Compliance with it is a matter of public necessity. The commission has striven to supply this class of literature to the public, and thousands of documents are now sent out, instead of hundreds, as formerly. This change is highly appreciated, and has had a satisfactory effect in securing better observance of law. The necessity which exists, however, for limiting the size of the annual reports as much as possible, precludes the possibility of publishing instructive papers on fish or fisheries, game birds and animals, etc., for which we have frequent requests.

The attempt to change the status of the commission by abolishing the present Board of three commissioners, and having a Board of six members * appointed, was not only one of the notable occurrences of the year, but one that was extremely unwise from many points of view.

The ostensible object of this effort was to secure representation on the commission from the western counties, and to give the commissioners a larger force to do the work, and this quite regardless of the fact that the chief advocate of the measure publicly conceded that the commission had never been so well administered at any time as now.

The opposition to this measure was extreme, and came from all sections of the State,† as well as from the press of other States. As a result, no action was taken by the Legislature on the bill referred to, beyond the hearing given by the committee on fisheries and game, which reported "leave to withdraw" to the petitioners.

FISH CULTURE.

Appropriation. — While no specific appropriation was made for fish cultural purposes, as already stated, our custom of preparing an unofficial itemized statement of the money required for the work enables us to give the amount estimated for the various purposes connected with fish culture; although it

* The bill introduced called for the appointment of six members, but it was understood that subsequently there was a desire on the part of its promoters to ask for its amendment so as to call for five instead of six commissioners.

† It would be feasible to quote extensively from the press, to show the opposition to this attempt to change the commission; but possibly the following brief extract from an editorial in the North Adams "Transcript" of Jan. 29, 1903, will show the feeling that was universal throughout the State: "In the light of our knowledge of the admirable record which has been made by Chairman Collins and his associates, natural astonishment is felt at the proposition to abolish the commission as it stands, and substitute in place of it a new commission of six members, who will hold meetings once in three months. The movement has its origin in Pittsfield. The plan is one which does not deserve a moment's serious consideration. It cannot have been devised from a sincere desire to advance the interests of Massachusetts fish and game protection. The way to help that cause is to hold up the hands of the present commission, to give it the sinews of war, — more adequate means to work with. Chairman Collins has labored faithfully, intelligently and successfully; he has made the laws respected, has protected the game and the fish, and is protecting them. He has made the department a terror to the snarer. Any movement to interrupt the good work now being done, while it might gratify some personal feeling, would be directly opposed to public interests."

is only just to say that this in part covers the expense of raising pheasants, since some of those who are primarily engaged in fish culture also give part of their time and attention to breeding and rearing birds. The aggregate estimated for under this head was \$6,805. Of this, \$500 was for stocking ponds and \$300 for stocking brooks, both of these appropriations being made to meet the requirements of special acts, — sections 5 and 19, chapter 91 of the Revised Laws. It is pertinent to state that the sum designated by law for stocking ponds, while at first adequate to meet the annual requirements of the people, is no longer sufficient to supply public demands, and only by the exercise of much tact and extreme economy has it been possible to nearly comply with the petitions for stocking ponds. This matter will be more fully discussed under the head of “Stocking Ponds.”

Although the law permits the appropriation of \$500 for stocking brooks, the course adopted the past two years was followed, on the recommendation of the commission, and \$300 was assigned for this work; this has been sufficient for the purpose.

It has been found in practice that the amount estimated for the cost of distributing fish is not sufficient; the utmost economy has failed to make it cover the expense. The reason is that the output of fish is growing immensely, and the demands on the commission to enlarge its field of operations in this particular are likewise developing to a remarkable degree. Instead of thousands, we now distribute millions of fish; and whereas formerly only trout fry of one species were supplied, and consequently there was only one lot of fish each year, we now have two seasons of distribution, — spring and fall, — and various species are furnished to the applicants to meet their varying needs.

In the aggregate this year's estimates were less than those of last year. This was because money was appropriated last year to purchase land at Sutton and to sink a well at Hadley, and no corresponding expenditures were made in 1903. Much has been done to improve the hatching stations, as will appear elsewhere, but this was accomplished without extra expense.

Expansion. — In many respects a new record has been made

in the work coming under this head, and the general trend has shown a gratifying advance beyond anything heretofore accomplished. In two respects, however, there have been obstacles to progress that were insurmountable; and, although it is believed these are only temporary, and each case was beyond the control of the commission, they are, nevertheless, noteworthy, for they show how uncontrollable causes may defeat plans and efforts. Reference is made (1) to the abnormal scarcity of shad eggs the present year, which made it impossible for the United States Fish Commission to send us as many fry as otherwise would have been easily possible; and (2) the fact that no law is on the statute books that compels the building of fishways.

In the breeding and distribution of fish there has been a reasonable advance, with the single exception of shad. This success has been accomplished, too, in the face of the fact that the results at the Hadley station, in the matter of rearing fingerlings, has again been most disappointing and disheartening, while the limits of possibility at the Sutton station had been so nearly reached last year that it seemed impracticable to do more there than was done in 1902; that so much was accomplished was due to extraordinary effort.

Everything that human ingenuity could devise to insure success in raising fingerlings at Hadley was done. No effort was spared, as will appear in detail elsewhere; but the natural obstacles appear to be beyond control, and disaster came, despite the utmost care and vigilance. In producing fry, or in growing various species of trout or landlocked salmon that were larger than fingerlings, the results attained at Hadley were all that could reasonably be hoped for or expected; but it does not yet seem feasible to successfully rear fingerlings at that station.

The output at Sutton has been satisfactory, especially in the matter of rearing fingerlings. However, much has been done to provide additional facilities, and there will be no halt in attempts to secure greater results until there is convincing evidence that the limit of possibility has been reached. Meantime, the hope is cherished that additional and adequate means for rearing fingerlings, which, at least, may supply what is

lacking at Hadley, Adams and Winchester, will ultimately be available to the commission; for, with the large and ever-increasing demand for fingerlings on the part of the public, for stocking ponds as well as brooks, and with convincing evidence of the advantage to be derived from the present system of stocking waters, the necessity of meeting the public demand is too apparent to admit of question. If this demand is as urgent and as important as it appears to be, no doubt its influence will be felt by those who represent the people, and means will be provided to meet it; but unless the people interest themselves actively to secure more adequate means for this work of rearing fish, they must content themselves with what can be done with present facilities, which are now being well utilized. However, it is confidently anticipated that it will be possible to increase the production of fish fry for several years to come. By the adoption of new methods it may be found feasible to stock ponds and rivers with large numbers of fry of certain species of fish at a much less cost than it has heretofore been practicable to supply these. Improvements along this line are contemplated, but it may not be easy to bring all of them in at the same moment.

Output of Fish. — A carload of shad fry was planted in the head waters of North River at Furnace Pond, where a similar plant was made last year. There were approximately 1,500,000 of these. They were put into the pond June 9, 1903.

This consignment was received from the United States Fish Commission in one of its cars. The largest output of fish was a lot of 2,200,000 pike perch fry that were put into various ponds. This plant was made between May 16 and 21. There were also planted in ponds 4,500,000 pike perch eggs.

The spring's plant of brook trout fry was slightly less than last year. This was due to a decrease in the demand for fry, and an extraordinary increase in the applications for fingerlings. Consequently, 903,000 brook trout fry and 10,000 brown trout fry were put out, — enough to amply supply all requirements, — and as large a number of fry as practicable were reserved for rearing to the fingerling size. In the fall distribution 59,660 fingerling brook trout were planted in the brooks; 1,500 yearling brook trout, 9,000 brown trout fingerlings, 1,000

rainbow trout fingerlings and 12,000 landlocked salmon fingerlings have been liberated in ponds; and 600 adult and yearling brook trout have been selected to put into ponds and rivers; while 1,000 brook trout and 500 rainbow trout fingerlings have been reserved to increase the brood stock. Mention should not be omitted that 6,000,000 landlocked smelt eggs have been put into ponds where the smelt has not heretofore occurred. Inasmuch as the smelt hatches successfully when its eggs are transplanted in this way, this work has substantially the same effect as stocking with fry. The aggregate output of eggs, fry and larger fish is thus shown to have exceeded 15,000,000. The relative value of these plants will appear more clearly when consideration is given to the fact that a larger percentage of the salmonidæ than ever before were fingerling trout and salmon.

The value of smelt in our landlocked waters is manifold. This species is the natural food of the landlocked salmon, which apparently thrives better upon it than if dependent upon any other kind of food. The smelt is also excellent food for other predaceous species. It is likewise a good food and game fish. Its rapid increase in the waters where it has been planted warrants the hope that it may serve a good purpose as a means of sport, as well as furnishing food for fish and men.

Method of Distribution.—The system of distribution adopted, both as applies to the free delivery of fish and the method of stocking waters twice a year, meets with the highest commendation. In only one instance that we are aware of has any fault been found. One of the recipients, who reported the fingerling trout sent him were in “perfect condition” when planted, declares it a “waste of time and money to both State and public to put in so few. Good streams,” he writes, “should have 5,000 to 10,000 at each delivery.”*

* We understand that this individual told the messenger who took the fish to him that he should have had 30,000 fingerlings. A declaration of this kind, or even of that over his own signature, indicates an ignorance of the possibilities of rearing fingerling trout, and likewise of the possibilities of a brook for supporting trout life, that is startling, not to speak of the indifference to the rights of other citizens. To supply 30,000 brook trout fingerlings to each applicant would require between 5,000,000 and 6,000,000 fish,—approximately one hundred times as many as we were able to raise, or probably a larger number of fingerlings of that species than is put out by all the States of the Union. Further comment is unnecessary.

John F. Luman of Palmer reported as follows: "Fish received and placed in the brooks in fine condition. All appeared strong and healthy. Consider them the best lot of fingerling trout I ever saw."

William S. Sheldon of Ashby avers: "The trout arrived in good condition."

O. L. Howlett of Holland says: "Fingerlings are just what we want to replenish our brooks. Three or four such replenishings would put our brooks in a condition so that fishing would be good."

William H. Leonard of East Foxborough writes: "Some of the trout were larger than have been received here previously, being about five inches long."

F. J. Piper of Townsend "was very much pleased with the trout and the fine condition in which they arrived."

"The trout were in first-class condition," writes Rev. J. S. Cutter of Orange, "and every one lively and active. Not a single fish was lost or injured in any way."

From North Brookfield E. D. Corbin writes: "These trout were very nice ones."

"A fine lot of fingerlings," says Cabot L. Smith of Chelmsford Centre.

F. A. Griffin of Lowell states: "The trout were received in fine condition; did not lose even one."

"Fish arrived in excellent condition," writes Alfred Read of Westfield, "and we were much pleased with them. They were large and very healthy looking fingerlings."

"Never saw a finer lot of fish," says C. F. Allen of Worcester.

F. S. Ames of Gardner reports: "We placed these trout in good water, . . . and they were in perfect condition. . . . I can see fine results from the fry and fingerlings placed in the streams in this vicinity."

"These trout were all in very good condition," says George W. Sherman of Adams.

"The fingerlings were in good condition." J. E. Stuart, Westminster.

"Fingerlings arrived in splendid condition. . . . In my opinion, we can have good fishing in Fiskdale brooks if we can

only continue to stock them for three or four years." P. S. Callahan, Sturbridge.

"This is the nicest lot I have ever taken away from the hatchery."* George L. Gill, Northbridge.

"As a result of stocking the brooks in this town, . . . trout fishing is the best it has been in twenty-five years; we got more trout and much larger fish. . . . The fry I had last spring have done finely this summer." William Pratt, Gardner.

"Trout came in very nice condition. Please accept thanks." H. F. Freeman, Brookfield.

C. H. Pease, a prominent merchant of Lee, who is president of a club having a club house at Greenwater Pond, in the town of Becket, writes, under date of Oct. 20, 1903: "Our people very much appreciate your efforts to stock our lakes and streams with game fish. The lake in which I am particularly interested — Greenwater, in the town of Becket — has been kept filled the past season, and the pike perch which you sent us in May seem to be doing nicely, — can see them in large numbers along the shores."

Deputy A. T. Hollinshead of Braintree says: "The fish put in the Quincy reservoir are coming good, for they can be seen jumping out of water all the time."

The foregoing will doubtless suffice to show the practically universal satisfaction with the service the commission is now giving both in the rearing and distribution of fish. Having in mind the multifarious obstacles to overcome in carrying fish successfully over long distances; the continuous care required to keep the water aerated properly, so as to have them in good condition; and the transportation by wagon over roads of greater or less length, and which are often rough and jolty, the complete success met with and the wide approval of the present method of distribution are reasons for satisfaction, since the highest aim and purpose of the commission is to serve the public to the best of its ability, and in every direction.

The only known obstacle to complete success was the lack of a greater supply of large cans for the transportation of fingerlings. Fingerlings or large fish are liable to suffer or even to die when carried in the cans formerly used for distributing

* In this case the applicant preferred to go to the hatchery himself for the fish.

fry. The funds available this year did not, however, admit of getting any more suitable cans; but, by the exercise of much care and vigilance, loss was avoided except in one instance, and then it was not excessive. A comparatively small expenditure next year will obviate the recurrence of a similar mishap, which, if only slight, is disconcerting.

The fall distribution of fish for the stocking of streams and ponds is of sufficient magnitude to keep several deputies busy for fully six weeks, despite the fact that they work to the limit of their capacity. A glance at the list of recipients of trout, and the record of ponds stocked, will show how wide-spread is this effort; that the fish go into nearly every town in the State, — frequently to several persons in the same town or city, — and often into sections more or less remote from railroads, where they can be safely taken only by the exercise of the utmost care and skill, while it is evident that any regard for personal comfort on the part of messengers cannot be seriously taken into consideration. Simple and commonplace as it may seem, the effective stocking of the interior waters of a State is one of those enterprises that demands devotion to duty, as well as skill and topographical knowledge. These are available, and are gladly supplied; but the fact should not be lost sight of that this work of fish planting, together with the distribution of pheasants and hares at the same time, takes from the law-enforcing effort a number of the most capable and energetic officers. It is true they often do double duty, to the extent that they do all they can to enforce the game laws on Sunday, when fish cannot be carried. But, nevertheless, the effect is that the available force for enforcing law is materially reduced, at a time, too, when it is most needed for the protection of game. This is sensibly felt, particularly in a year like the present, when the financial resources have not been sufficient to put a number of extra men on the paid force during the open game season, — a period when wilful violation of law seems to be most rampant. There is, however, reason to hope and expect that this is only a temporary condition, and that the present method of fish distribution is sufficiently popular to command the necessary support that will admit of it being fully carried out without crippling any other part of the work.

A full explanation of the system of notification of applicants for fish, etc., was published in our last report, and need not be repeated here. Now that it is better understood by all concerned, the system appears to work admirably.

Work at the Hatcheries. — The effort to bring the hatcheries nearer to a condition that will enable them to completely fulfill their functions has been continued with unabated zeal and purpose. So far as this relates to improvements for breeding and rearing pheasants and hares at Winchester and Sutton, detailed mention will be made in other chapters. No repairs or improvements have seemed necessary at the fish hatcheries at Adams and Winchester, for the reason that these are new, and are only what may be called developing stations, where fish eggs can be taken in the eyed stage, hatched out and reared to the stage for distribution as fry. It does not at present seem possible to do anything with these stations beyond making them convenient distributing points for fry, — and this is what they were intended for.

The effort to improve the Sutton station has been continued, as will appear in the report of the superintendent. This has been chiefly in the direction of clearing out the underbrush on the newly acquired land, tapping springs for additional supplies of water, and building some new pools for rearing trout. The changes made, while they have been material, adding greatly to the appearance and resources of the station, have been carried on by the regular force at the hatchery, so that the cost has been little or nothing.

In other respects the work of bettering the condition of the grounds, by removing stumps, planting flowers, etc., has been continued; and the advance made in various directions indicates that the day may not be distant when this station will be a model of its kind, — not only in the intelligent utilization of all resources for the breeding and rearing of fish, birds and animals, but likewise in those respects that contribute to the comfort of the superintendent, and appeal to the good taste of the visitor who approves of tidy and well-kept public places of this kind.

Little has been done at the Hadley station that would properly come under this head. The doubt as to the feasibility of



THE "TUB SYSTEM" AT THE SUTTON HATCHERY. — Examining young trout.

making this a first-class fish cultural station has certainly not been removed by the experience of this year; and while this remains or is intensified, there is no incentive to do much outside of the continuous effort to better fish rearing conditions. At present there is little probability that anything can be successfully accomplished there beyond hatching fry and maintaining a brood stock of fish, under difficulties; and there seems to be ample reason for anticipating the necessity of putting this into the second grade of stations, and looking elsewhere for different conditions, if the work is to be prosecuted on a scale commensurate with the public demand. Under such circumstances it seems like a waste of effort to attempt general improvements on a scale that would be justifiable and proper if the conditions were different.

Superintendent Arthur Merrill has submitted the following report, which contains many details relating to the work at the Sutton station that are interesting and instructive:—

The collection of brook trout eggs in 1902, from which the stock of fish raised this year was hatched, amounted to 624,000, obtained from 640 trout. Of these, 200,000 eggs were shipped to the Adams hatchery in January, and 424,000 were kept here for hatching. In May 255,000 brook trout fry were distributed, and the remaining fry of this species, which, less the loss in hatching, was 100,000, were reserved for rearing to fingerlings.

In addition, 25,000 brook trout fry and 20,000 landlocked salmon fry were hatched from eggs obtained from the United States Fish Commission, and 20,000 brown trout fry from eggs collected from brood fish in the pond here. The stock of brown trout was increased in the spring by 15,000 fry received from the Hadley hatchery.

No rainbow trout eggs were received, and for the first time in several years no stock of this fish was raised at this station for distribution. The whole stock of fry reserved was 180,000, which was 27,000 less than the number kept for rearing last year. The fingerlings raised this year were somewhat less in number than those of 1902, but far superior in size and quality. No trouble was experienced from epidemic diseases, and no sickly lots of fish were on hand at the time of distribution, the season when such trouble is to be mostly apprehended. Some feeble lots of fry in the upper tubs in the spring, and brown trout later in the summer in the same place, were the only fish that suffered loss from sickness, and the loss in these cases was slight. The fish of all kinds, and in all ponds, were

larger than the year before, and, with but one former lot excepted, were larger than any previously grown here. As a result, it was possible to fill a largely increased number of applications satisfactorily. Several thousand fish exceeded four inches in length, and hundreds were five and six inches long. Many of these large fish were males, sexually mature, though only eight months old. The rapid, healthy growth of the fish was largely due to the rains of the summer, which were very abundant, and maintained a full supply of spring water which did not deteriorate in the summer and fall.

The fry were distributed as usual for rearing, the brook trout in tubs and pools supplied by spring water and the brown trout and salmon (except some trial lots in the upper tubs) below the dam where the pens and tubs receive their water supply from the pond. The most of the tubs below the dam were empty throughout the summer, because of the failure to receive rainbow trout eggs.

The growth of the fry presented no unusual feature, but it was observed that the great increase in size was not at the expense of numbers, for the pools where the largest ones were grown contained as many or more than usual. The upper tubs produced less brook trout than usual, and one pond showed a shrinkage, 6,000 being produced where 10,000 were grown the year before, but this was fully made up by gains in the other ponds. The total number of fingerling brook trout raised was a little over 50,000.

The heaviest loss of trout fry was from causes generally termed unknown. This includes the losses from frogs, snakes, predatory birds, animals and insects, cannibalism among the trout, and loss from disease or weakness, when, as is often the case, mud, vegetation or masses of conferva conceal the fish that die. The loss varied in different pools, and was invariably more severe where access to the water is easy, and especially where the margin is shallow. It is possible to reduce this loss some by making improvements that will safeguard the fish, and permit care for them that will check cannibalism and disease. Although, as a rule, the limit of production has been reached in the ponds, there are some exceptions each year, where the losses are heavier than ordinary, and a pond may yield several thousand less than it should. The results were such in one of the smaller ponds, where the stock of fish exceeded by several thousand the number in that pool any year before; but at midsummer the fish disappeared rapidly, and were soon reduced to less than the ordinary stock, but not the slightest evidence as to what was taking them was found. The pond was enclosed with netting, and the losses ceased.

From 20,000 salmon eggs 18,000 to 19,000 fry were secured, but soon after hatching this number was reduced one-third by failure of the water supply in the hatchery, due to defects in the pipes. These

fish escaped the attacks of disease that have depleted this kind in years before, and 10,000 were planted in equal lots in various ponds.

The 35,000 brown trout fry produced 9,000 fingerlings. One lot of these were grown in the plank pens near the hatchery, where the loss of fry was quite heavy through the spring months, but the fingerlings raised were exceedingly large. The rest of the brown trout were grown in the upper tubs in spring water, and were small, though healthy; the loss was very slight.

In April 5,000,000 pike perch eggs were received from the United States Fish Commission station at Swanton, Vt., on Lake Champlain, but they were in such bad condition on arrival that only 1,000,000 hatched. This number, however, was all that could be hatched well with the present flow of water, as the supply pipes are badly clogged with rust scales.

Early in April smelt eggs were collected from Lake Quinsigamond to the estimated number of several million, and shipped to Watuppa Lake, Fall River, and lakes in Ware and Pittsfield. The smelt is very prolific, and such a high percentage of their eggs is usually fertilized and hatched that one planting commonly stocks a body of water abundantly.

The loss of fry due to snakes and fish-eating birds was possibly less than usual, as not so many of them were seen about the ponds, and greater success attended their capture when they did appear. Thirty kingfishers were killed, nearly all of them by means of pole-traps placed over the ponds where they usually fished. Nine herons were trapped before midsummer, and for the rest of the season none were seen. A method of trapping herons was tried that proved very effective, and will doubtless serve to keep the numbers of this bird well reduced. Small pools, three to four feet broad, were made near the principal feeding ponds, and around the margins under the water a circle of traps was placed. The herons were attracted to these pools by a few trout, usually about 20, placed therein, and rarely escaped capture at the first visit. Snakes were well reduced in the spring and previous fall by hunting them on warm days, when they were out sunning themselves. Many were killed then, and few were seen about the ponds during the summer.

The insect that has frequented the upper tubs for several seasons appeared at the usual time, and destroyed trout that could not be estimated at less than several thousand. Covers were fitted more effectively than usual, but it was not possible to prevent the loss wholly, as misplaced or warped covers often exposed the fish. The invader, whatever it was, preferred brook trout. Brown trout and salmon, though left uncovered, were not touched, and the same was observed of rainbow trout in previous years.

Before another season a new line of pipe to supply the hatchery will be laid to a point halfway down the pond, and it is intended to locate the tubs at this place, using the hatchery pipe to supply them. It is believed that the removal will end the trouble, as the insect causing it appears to inhabit the locality near the tubs, where the woods are dense and the ground covered with thick deposits of mould, underneath and through which numerous springs flow. The new location selected is dry, open ground.

Improvements about the station were made under somewhat increasing difficulties, as the ordinary routine work constantly requires more time, and, the time being limited, less of it can be devoted to permanent work, although each year the need of such work grows more urgent.

In the winter, which was as soon as the work could be done following the purchase of the land, a pond was excavated above what is called the "yearling or No. 2 pond," and a system of ditches draining all the springs supplying the ponds was started. This work has resulted in draining many stagnant pools, where masses of vegetation formed obstructions, and, if carried to completion, will bring all the water to the central ditch in underground drains.

In the No. 2 pond a stone dam was built, cutting off the shallow arm at the head, and making another pool which will serve for rearing fry. This dam is broad, up and down stream; it is also provided with a covered wasteway, which makes an excellent shelter for the yearling trout that are in the pond below. Walls of stone laid in cement were started from this dam, to eventually continue around the pond; and, following this work, the bottom will be paved with flagstones with cemented joints. The pond is used to hold the brood stock after spawning, and it is found necessary to take some measures to prevent them injuring themselves through their efforts to go through the spawning process. The fish, though relieved of their eggs, still appear to be sexually excited, and work as though they had the eggs to deposit; they dig holes for nests in the bottom of the pond, which is gravel so hard that it can only with great difficulty be loosened with a pick. The exhaustion and injuries because of this work are fatal to many fish, the number lost sometimes exceeding one hundred large trout. If stones can be carted to this place in the winter, which is the necessary time for doing it, this work can be done another year, and a repetition of the loss mentioned can be prevented.

Below the hatchery the part of the brook channel, which is used as a runway for trout, was cleaned out and deepened; for convenience in doing this work, a small dam was built near the east end of the hatchery. This runway will be made deeper for the next season,

and is one of the places where a protection of netting is urgent. Less than the usual amount of improvements for fish cultural work was made through the summer, as the work on pheasant pens, hen yards and houses required all the spare time for nearly three months, and at other seasons many minor improvements were made and much work was done on the grounds. This work is largely for the purpose of extending the area of cleared land, to permit it to be used for the work on hares and pheasants, and also to keep it in better order. All of the State land was wild, where the forest was recently cut, and, where unimproved, is covered with stumps and a thick growth of sprouts. The wooded part recently purchased was cleared of underbrush and fallen trees, which was done as a preliminary work to cleaning out the springs.

The spawning is late this year, because of the unusually cold season. The collection of trout eggs has been greatly delayed, because of the ice that formed in the brood pond; and some eggs have been lost in consequence of fish spawning under the ice. The number of spawners was less than expected; due in part to an excess of males in the young stock added to the breeders the year before, and in part to a decrease in the fish put into the pond. We will get upwards of 600,000 brook trout eggs, more than 40,000 brown trout eggs, and I have collected 6,000 healthy and vigorous eggs from four landlocked salmon that weighed $2\frac{1}{2}$ to 3 pounds each.

The stock of brood brook trout on hand consists of 650 adults and 1,500 yearlings. Of the former, 300 are large males, that should be disposed of; and there is also an excess of 300 yearling males that we do not need.

I have found about the usual number of adult fish affected by the throat disease, and taken about 50 thus afflicted from the brood pond. Among the yearlings I have found about the same number having the disease in an incipient stage; these have also been removed, for the disease would ultimately develop so as to spoil their usefulness before another spawning season.

Specimens of trout affected with this trouble have been submitted to Dr. C. S. Hodge of Clark University, who kindly undertook an examination of them. I also gave specimens to Mr. C. C. Jocelyn of Bucksport, Me., who is an artist familiar with diseases of fish, and who promised to send me drawings of the trout I gave him which would show the effect of the throat affection. Dr. Hodge has determined that the disease is due to bacteria, but will make a longer study before reaching final conclusions. I shall take some live specimens to him this week, which he will keep in an aquarium for observation.

Fourteen Belgian hares, seven bucks and seven does were received in June from Winchester, but did not become sufficiently matured to

breed this season. They were kept in pens that were constructed for a trial of hares four years ago, but these not being suitable for winter, other pens were arranged so that they might burrow into the ground. This they have done, and to all appearances have gone deep enough to make warm winter quarters. The many dry, sandy knolls on the hatchery grounds make it possible to use such pens without limit, if they are successful. An ample supply of green food for summer and forage and vegetables for winter feed for the hares was raised, and this supply can be increased to any extent desirable to provide for an increase of the animals.

The following report, compiled from letters received from William D. Tripp, superintendent of the Hadley station, constitutes a comprehensive account of the operations at that place, and, incidentally, indicates the obstacles met with and the utter hopelessness of attempting to rear fingerling trout or salmon there : —

During the spawning season at the close of 1902 and the beginning of 1903 a total of 291,000 eggs were obtained from the various species of brood trout at this station. Of these, 201,500 were from brook trout, 64,000 from brown trout, and the rainbow trout yielded 25,500 eggs.

In addition, 25,000 brook trout eggs were received from the government hatchery at St. Johnsbury, Vt., which, with the local collection, made a total of 226,000 brook trout eggs at the station. Of these, 16,000 died while in incubation or as young fry, leaving 210,000 healthy fry in the spring. At that time 180,000 of these fry were sent out to stock the brooks, and 30,000 fry were kept at the station to be reared to fingerlings.

From the brown trout eggs 4,100 were lost in incubation, leaving nearly 60,000 healthy fry of this species. Ten thousand of these fry were planted in Loudville River at Westhampton, 15,000 were sent to the Sutton hatchery, and the remaining 34,900 were kept at Hadley to rear to fingerlings, but were nearly all lost.

The loss of rainbow trout eggs during incubation was slight, it did not exceed 500. Five hundred eggs and fry were sent to the Mt. Holyoke College for zoölogical studies; the remaining 24,500 fry were reserved at the station for rearing to fingerlings.

We did not receive any landlocked salmon eggs at this station this year, and the three species already alluded to — brook trout, brown trout and rainbow trout — were all the kinds of trout handled at Hadley in 1903.



PONDS AT HADLEY FISH HATCHING STATION. — Artificial rearing ponds in foreground. One on left fed partly by springs.

The attempt to raise fingerlings may be considered a failure, and less success was secured this year with brown and rainbow trout than with brook trout. The fry of all varieties died in large numbers, and nothing that could be done was sufficient to prevent the fatalities. The brown trout suffered the greatest mortality, only 100 fingerlings being reared from nearly 35,000 fry. The rainbow trout did only a little better; 1,400 of these reached the fingerling stage. The brook trout did slightly better than either of the other species, 3,500 fingerlings being saved out of 30,000 fry. This was contrary to the usual experience, for in previous years the rainbow and brown trout fry have endured the conditions at Hadley with less loss than brook trout.

The temperature of the water received into the hatching house from the artesian well that was drilled last year remained evenly warm during the winter, consequently the eggs hatched quickly and the fry grew very fast during the cold weather; they attained an extraordinary size before the period for the spring distribution arrived.

On April 24, 1903, 5,000,000 pike perch eggs arrived at the Hadley station from the United States Fish Commission station at Swanton, Vt. These eggs were in very poor condition, fully 50 per cent. of them being dead when received. But, nevertheless, by dint of much care and constant attendance upon the eggs during incubation, 1,200,000 fry were hatched from the lot. These were planted in ponds in this section of the State.

In preparation for raising fingerlings, and with the hope that better results could be secured by using the water from the artesian well than by using the brook water, as formerly, in March a system of twenty tubs was arranged in front of the hatching house, the tubs being removed from alongside of the brook, where they stood last year. These were placed on a platform built in a terrace-like form, so that the tubs were arranged in groups of fours, one group below the other, thus permitting the water to flow, by gravitation, from one set of tubs into the other, thereby supplying all with one lot of water. To accomplish this, a pipe was connected, inside the hatching house, with that which led from the artesian well and supplied the hatchery with water. The outer end of this new pipe led into the upper tier of tubs, from which the water passed, as already stated, into the tubs next below, and so on through the whole system. Unfortunately, however, it was discovered that, after the water was turned on to its fullest capacity, the supply was insufficient for both tubs and hatchery.

After the greater part of the fry were distributed from the hatchery, where they had been kept in the troughs until that time, several thousands were put into the tubs; but in a few days these began to die rapidly, although no cause could be assigned for the mortality, for

the fish were in the same kind of water that they had done well in while in the hatchery.

The large rearing pool above the pond where the brook trout are kept, and which is supplied with water from flowing wells, was divided into four nearly equal sections by partitions of plank and wire-netting screens. In April 50,000 brook trout fry were put into three sections of this pool, and in May 25,000 rainbow trout fry were placed in the fourth compartment. Much reliance was placed on this pool, in which the conditions were thought to be favorable to success. Floats made of willow were placed in each section, to furnish shade for the fry and to assist in keeping the water cool.

The young fish ate well and grew fast. Very few dead fry were seen in the pool, but they disappeared mysteriously from day to day without apparent cause. In July, however, when the fry had attained a size which would permit of their being handled, they were all caught for sorting into different grades, according to size. It was then seen that their size ranged from one and one-half inches to four inches in length, and the conclusion was reached that the mysterious losses were due to cannibalism, the larger trout having indulged in their propensity to devour their smaller brethren.

After having been sorted into different grades, so as to get fish nearly of the same size for each grade, the trout were returned to the sections again, and there was no further fear of cannibalism, for some time, at least; it is probable there was no further loss from this.

Meantime, 20,000 brown trout fry were kept in the tubs until a considerable number died and all appeared to be weak and sickly. It was then decided to remove them to a small pool, where the conditions were thought to be fairly good. But the trout were so weak when put into the pool that all of them went to the bottom and lay there quite inert. And now came a catastrophe, for what had looked like little sticks lying on the bottom of the pool turned out to be cadis worms, and the fry were soon seized, killed and devoured by them; only the few trout which still had strength sufficient to shake off the worms escaped the slaughter.

As will be seen from the foregoing, all attempts to raise fingerlings at this station have failed, and all species have suffered alike. It would be better undoubtedly to put the fry into the brooks than to try to rear them to fingerlings with the conditions as they are. The little additional water obtained from the artesian well is warmer than we had before, and is of no practical use for rearing fingerlings. Nor is it considered feasible to secure additional spring water enough to be of any service without a large expenditure of money, and even then the chances of the water being suitable for trout raising are not promising.

At the present time there are 475 brook trout in the brood pond, varying from two to three years old; there are also 2,000 brook trout that were a year old in March, 1903. So far as known, 209 large brook trout are missing from the brood pond. Presumably they have been destroyed by enemies, to which reference will be made in a succeeding paragraph.

There are on hand in the pool above the large pond 435 rainbow trout that are three and four years old. In the planked pools below the dam there are 132 four-year-old brown trout that are in excellent condition. Only 3 fish of this species have been lost this year, and those now living are in fine condition. They have done well, despite the comparatively high temperature of the water in mid-summer. Eighty-five four-year-old landlocked salmon are also kept in the planked pools near the brown trout, and appear to thrive.

The adult fish, or trout from a year old upward, seem to do well in water that fry rapidly die in. Where the brown trout and landlocked salmon were kept the water was supplied from the large pond through a three-inch pipe. Its temperature ranged from 60° to 68° F., and the fish apparently did well in either. In the pool where the adult rainbow trout were kept the temperature was from 55° to 68°, and where the brook trout were located it went from 57° to 68° F.

It will thus be seen that the maximum summer temperature of the water at this station is 68° F., which is high for trout, and the fact that *S. fontinalis* does so well is a reason for satisfaction.

Nothing has been done in building new pools, for there is no water for any more, and those already available are sufficient for any anticipated needs of this station.

The willows which were planted along the sides of the pools have taken root, and they grew to about three feet tall last summer. It will be some time before they will be big enough to properly shade the pools. Nothing beyond this and the planting of a few other trees near the pools has been attempted in the way of providing shade or shrubbery, for there are about thirty head of cattle continuously roaming over the land of this station, which is not fenced, and they would destroy anything they could browse on.

Much effort has been expended to keep in check the various enemies of trout that have caused so much destruction in the brood pond. During the year five mink have been trapped, and six herons (commonly called "quaks"), three blue herons and twenty-two kingfishers have been shot. Many others have been seen that could not be approached near enough to make a shot effective. It is possible fish hawks were among the depredators, but none were killed. An eel twenty-eight inches long was caught while the large trout were being taken for their eggs. It is well known that the eel

is very destructive to fish life, and this specimen has no doubt been an active factor in reducing the stock of breeding trout. Whether there are more or not in the big pond is a matter of conjecture, for the bottom is soft mud, and eels could bury deep into it and escape observation, should it be drained.

The outlook for eggs this fall and the coming winter does not differ materially from that of last year. There are about the same number of large brook trout, but more or less eggs should be secured from the 2,000 yearlings.

The brown trout will probably yield about as many eggs as last year; they should not fall below 60,000, and may considerably exceed that number.

Inasmuch as only a few of the rainbow trout spawned for the first time early in the present year, many of them had not attained sexual maturity, and had no eggs. This spawning season they are expected to yield a much larger number, but of course no estimate can be given that may be nearly correct.

From one female landlocked salmon 1,000 eggs were taken about the middle of November, but as late as the last of that month there were no indications that any more of this species were gravid.

Ponds stocked. — Thirty-four great ponds of the State have been stocked with desirable varieties of food fish, and regulations controlling fisheries in twenty of them have been applied. Eighteen of these ponds have been stocked for the first time under section 19, chapter 91, Revised Laws, and two of them, — Quabbin Lake in Greenwich, and Massapoag Pond in Dunstable, Groton and Tyngsborough, — which were stocked three years ago, have been restocked, and the fisheries in them have again been regulated in accordance with law and in compliance with the petitions submitted. In addition to these, several ponds that were stocked in 1901 and 1902, and the fisheries in which have been regulated, were restocked; while a few ponds were stocked upon application, but no regulations have been applied to them. Other ponds were stocked with pike perch eggs, and several ponds that had previously been stocked with landlocked salmon were stocked this year with smelt.

Following are the names and locations of the ponds, also the species of fish put into them, etc. : —

Winthrop Lake, Holliston, was stocked with pike perch; Nuttings Pond, Billerica, White Pond, Concord, and Long

Pond, Royalston, were each stocked with pike perch and brown trout; Flax Pond, Lynn, was stocked with pike perch and rainbow trout; Greenwater Pond, Becket, with pike perch and landlocked salmon; Laurel Lake, Lee, Spectacle Pond, Littleton, and Neck Pond, Barnstable, were stocked with landlocked salmon;* Shaw Pond, Becket, Hagget's Pond, Andover, Forge Pond, Littleton, Hampton Pond, Westfield, Pearl Lake, Wrentham, Bolton Pond, Wachusett Mountain State Reservation, Harris Pond, Methuen, and Pottapaug Pond, Dana, were stocked with brown trout.†

All the foregoing were stocked for the first time by the State under section 19, chapter 91, Revised Laws. Quabbin Lake in Greenwich, and Massapoag Pond in Dunstable, Groton and Tyngsborough, were stocked with landlocked salmon, and regulations have been applied to them for a second term of three years.

The following ponds, which were stocked, and the fishing therein regulated, in 1902, were restocked: Winnecunnet Lake, Norton, with brown trout; Middle Pond, North Dana, and Hardwick Pond, Ware, with pike perch. Round Pond, Palmer, which was stocked and closed in 1901, was restocked with pike perch; Fort Meadow Pond and South-west Pond, Marlborough, and Forge Pond, Granby, were stocked, by request, with pike perch, but no regulations were applied. Lake Quinsigamond, Worcester, was stocked with yearling brook trout; but, inasmuch as the fishing in this lake is regulated by law, no action was taken by this commission in that direction.

The regulations governing fishing in the ponds and lakes to which they have been applied are uniform.‡ These regulations prohibit, for three years from date of issuance, "all fishing from the first of November to the first of June of each year." Fishing is permitted with single hook and hand line, or line (with single hook) attached to a rod or pole held in the hand,

* It is worthy of note that landlocked salmon have thrived in Neck Pond as a result of previous stocking, as shown by the fact that several adult salmon have been caught recently.

† All trout and salmon put into these ponds were fingerlings.

‡ Bolton Pond, being a small body of water on a State reservation, is an exception, as the rules governing the reservation apply to it.

on Monday, Wednesday and Saturday of each week, from the first day of June to the first day of November of each year, while the regulations are in force. A penalty of \$20 for violation of these regulations has been fixed by the commission, in accordance with law.*

The ponds stocked with landlocked smelt were as follows : Onota Lake, Pittsfield ; Snows Pond, Ware ; and Watuppa Lake, Fall River.

Pike perch eggs were planted in Singletary and Dority ponds, Millbury, Lake Quinsigamond, Worcester, and in Bridgeman's Pond (a series of three ponds) in Belchertown. The numbers planted ranged from half a million to two and a half millions to each pond.

The ponds stocked with smelt had previously been stocked with landlocked salmon, and the fishing therein regulated by the commission. Landlocked smelt have been introduced primarily to supply a natural food to the salmon, and thereby make surer that they will thrive. A secondary though important object is to supply our ponds with a species of fish which, though small in size, is alike desirable for food or sport. In each case the ponds were heavily stocked with eggs, which hatch with little loss ; and there is ample reason to believe that smelt will be abundant in those ponds, in a comparatively brief time.

Of the ponds stocked with pike perch eggs, Bridgeman's Pond had been stocked, and was closed in 1900 ; fishing in Lake Quinsigamond is regulated by special act ; but there are no restrictions to fishing in the Millbury ponds.

It was anticipated that the commission would be in a position this year to stock a considerable number of ponds heavily with pike perch, inasmuch as the United States Fish Commission generously sent a large consignment of eggs. But the eggs were received in bad order, due to improper method of shipment by the official in charge, consequently much difficulty was experienced with them. Under the circumstances, it was

* Regulations which were applied to Turnpike Pond, Wrentham, in 1900, and to Milford Pond, Swansea, in 1902, because of misrepresentations that these were great ponds of the State, were withdrawn the present year, when it was found upon examination that each of the ponds was artificial, and, therefore, not entitled to protection by the State.

deemed best to put the bulk of the eggs into ponds, and let them take the chance of hatching, while those that seemed to be the best of the lot were kept at the hatcheries and incubated in the ordinary way. These, however, did not exceed one-third of the number received. Pike perch eggs are not easy to handle successfully under the best conditions, and there is reason for congratulation on the result obtained from those received, even if there was some disappointment with the order in which they arrived at the hatcheries, — an incident of fish culture which may, we hope, not be repeated in the future.

For the second time the mortality to the rainbow trout fingerlings we attempted to rear at Hadley so nearly exterminated them that only enough were left to stock one pond. If ordinary success had been met with in rearing this species, enough fingerlings would have been available to heavily stock a number of ponds.

The success which has attended the stocking of ponds in recent years, and the regulating of fishing therein, has generally been great, and has resulted in much satisfaction to citizens. The commission has received numerous letters and reports, in which mention is made of the marked improvement in fishing on closed ponds, due to an increase of fish. Brief quotations from some of these appear in the chapter on "Pond and Brook Fishing." There can be no question of the advantage to fish of prohibiting winter fishing, by which a few individuals, fishing through the ice, can deplete the fish in a pond to such an extent as to ruin fishing for the summer angler. To the extent that our regulations prohibit ice fishing, much good is done; and this is supplemented by the introduction of good food and game species in stocking the ponds. The wide recognition of this is evidenced by the extraordinary demands on the commission to stock a large number of ponds each year.

The recent amendment of the law (section 19, chapter 91, Revised Laws), whereby it is now possible to restock and reapply regulations, affords an opportunity to bring many of the ponds into good fish-bearing condition, rather than to leave them to be "fished out" to the last degree as soon as possible after the expiration of the term for which they have been closed.

Brooks stocked and closed. — Heath Brook in Tewksbury and Content Brook in Billerica have been stocked with brown trout; Shawsheen River at Andover has also been stocked with the same species. These streams have been stocked in compliance with petitions, and regulations have been applied to them in accordance with section 5, chapter 91, Revised Laws.

These streams are closed to all fishing for three years from December, 1903, with the following exceptions: fishing is permitted with single hook and hand line, or line (with single hook) attached to rod or pole held in the hand, on Tuesday, Thursday and Saturday of each week during the trout fishing season, for the year ending Dec. 1, 1906. Penalty for violation of regulations is \$20.

Rivers stocked. — North River was stocked with shad, nearly 1,500,000 fry of this species having been planted in Furnace Pond at the head waters of the stream. As already noted, Shawsheen River has been stocked with brown trout at Andover. Last year it was stocked with the same species at Tewksbury.

Examination of Ponds. — The examination of ponds was begun earlier than usual this year, because of the abnormally warm weather in the latter part of May, the result of which was that the temperatures were nearly as high as in midsummer. The work was, however, interrupted in June, owing to the unseasonably cold and stormy weather during that month. Later it was resumed, and in no year has it been so vigorously or so widely prosecuted. We publish descriptions of 26 ponds (2 of them of small area that are on a State reservation) which have been examined, and allusion is made to another that was visited, but could not be investigated for lack of a boat, although the fact was determined that it was a natural great pond of the State. This makes an aggregate of 27 ponds that have received the careful attention of the chairman. And it should not pass unnoticed that these waters are located in various parts of the State, from the extreme western part to Cape Cod. In some cases they could be reached only by long carriage drives, as they are usually off the regular lines of travel by rail.

This particular branch of research is not only important

from the stand-point of the obtainment of information required for the intelligent stocking of ponds with fish, but it is also necessary that we may avoid complying with petitions to stock private ponds which have been misrepresented to us as great ponds of the State. It is to be regretted that we have recently found that several ponds which we have been requested to stock in accordance with law are private waters, flowed under the mill act, and therefore that we have no legal right to control fishing in them. If the practice of filing such petitions continues, it will compel us to decline to stock any pond until we have opportunity to determine its legal status. In the meantime, the publication of certain facts about ponds, as the result of examination, adds to our knowledge of them, and preserves a permanent record the value of which cannot be overestimated. In four years 69 ponds have been examined, and many more have been visited, but could not be investigated because of lack of a boat, although valuable information regarding them was obtained.

Following are brief descriptions of ponds visited in 1903 : —

Snake Pond, Sandwich: This pond is situated near a little village named Forestdale, in the south-western section of the town of Sandwich. The principal species of fish are black bass, yellow perch and pickerel. The bottom of the pond was found to be mostly hard and clean, but in midsummer it is generally covered with grass. In the cove, so called, the bottom is muddy for the most part. The shores of the pond are generally small stones, pebbles and gravel, with patches of sand here and there. The maximum depth obtained was 33 feet. The pond was examined on May 19, on which date the air temperature in the sun was 102° F. The surface temperature of the pond close to the shore line was 73°. The temperature at various depths was as follows: 66° at the surface in the middle of the pond, 65° at a depth of 12 feet; 62° in 23 feet; and 60° in 33 feet.

Lawrence Pond, Sandwich: This pond is at the village of South Sandwich, and is of considerable size, but is shallow throughout, with soft mud bottom in the deeper portions, on which there is a considerable growth of grass in midsummer. There are, however, patches of clear white sand, stones, peb-

bles and gravel. The principal species of fish are black bass, white and yellow perch, pickerel, sunfish and catfish. The following temperatures were obtained on May 19 : surface, 66° F. ; at depths of 17 and 23 feet, 64° ; and 62° in 25 feet, which was the maximum depth secured.

Peters Pond, Sandwich : This is a fine large pond, and is reputed to have a depth of 60 feet, although the maximum depth found was 42 feet. There are a few large pickerel in this pond, but the principal species of fish are black bass and white and yellow perch. It is reputed to have neither sunfish nor catfish. For the most part the shores are very steep, and the pond is deep close to the shore line. At a distance not exceeding 100 yards from the shore a depth of 38 feet was obtained. The bottom seems to be diversified, and for the most part composed of mud and sand. The shore is various in its character, having stretches of white, sandy beach, while in other places it is composed of stones, pebbles and gravel. The sandy beaches, as a rule, slope gently to the water, but where the shores are rocky they fall off steeply. This pond was examined on May 20, when the temperature of the air was 90° F. The temperatures of the water were as follows : surface at shore and shallow water, 70° ; the temperature was 61° in 33 feet not far from the north shore ; 66° at the surface in the middle of the pond ; 60° in 38 feet and 42 feet.

Spectacle Pond, Sandwich : The principal species of fish in Spectacle Pond are pickerel, black bass, yellow perch, and occasionally a large eel. There are reputed to be no white perch, and no sunfish or catfish. The maximum depths are generally from 18 to 20 feet, although the maximum depth obtained was 19 feet. The bottom is reputed to be mostly mossy in summer, and was found to be soft and grassy where soundings were taken at the time it was examined. There are stretches of white, sandy beach here and there sloping gently to the water, but there are also areas of shore that have small stones, pebbles and gravel. On May 21, when this pond was examined, the surface temperature some distance out from the shore was 70° F., and the following temperatures were obtained in the depths mentioned : 64° in 18 and 19 feet ; and 66° in an intermediate depth.

Scuddings Pond, Taunton: This pond, which has been officially designated as Scuddings Pond, but the local pronunciation of which is Scaddings Pond, is of considerable size, and is now generally known as Sebatia Lake, this name being given to it because of the location of Sebatia Park on the shores of the pond. There are some islands in the pond which add much to its attractiveness. Sebatia Park, to which reference has been made, is a favorite resort for citizens of Taunton. The principal species of fish are pickerel, black bass, white and yellow perch and pout or catfish. The depth varies considerably, being shallow in some sections, while in a large area in the main body of the pond it ranges from 20 to 30 feet, the latter being the maximum obtained. The bottom is chiefly soft mud, but there are patches of sand and some stones, while in the shallower portions of the pond there is a profusion of grass on the bottom, and large numbers of lily pads. The following temperatures were obtained on October 7, when the examination was made: air, 70° F.; surface, 67°; at depths ranging from 7 to 30 feet a uniform temperature of 64° was found.

Watsons Pond, Taunton: The fish in this pond are the same as those in Scuddings Pond, due probably to the fact that the two bodies of water are connected by what is called Watsons Brook, although it is more of a channel than a brook, since the water in it flows either way whenever one pond rises slightly above the other. Although of considerable size, Watsons Pond is shallow, and 10 feet was the maximum depth obtained. The surface temperature was 68° F., and the bottom temperature at depths ranging from 9 to 10 feet was 64°. The bottom is sandy for the most part, with patches of gravel, stones and muddy sand.

Winnecunnet Lake, Norton: This is a shallow pond, of considerable size. The principal species of fish are pickerel, yellow and white perch, catfish, sunfish and shiners. There is a difference of statement regarding the abundance of fish, some claiming that they are generally scarce, with the exception of catfish or pout; while others assert that yellow perch and pickerel are very abundant, and fair catches of white perch are obtainable. Two small brooks run into the pond. The bottom is muddy and sandy for the most part, and there are lily pads

in the shallower sections. On October 7, when the examination of the pond was made, the following temperatures were obtained: air, 70° F.; surface, 69°; and the uniform temperature of 64° in depths ranging from 8 to 13 feet, the latter being the maximum obtained.

Massapoag Pond, Dunstable: The most important species of fish in this pond are pickerel, white and yellow perch, hornpout or catfish, sunfish or roach, and shiners. The white perch are there in consequence of the pond having been stocked with this species by this commission in 1901. The bottom of the pond is hard, as a rule, but is soft in spots, and especially so in that part of the pond where the water has been raised by flowage, and where formerly there were meadows. In these sections, where the water is rather shallow, there are some lily pads, but generally speaking there is little vegetation of this character in the pond. This is a fine, large sheet of water, about a mile and one-half long and of varying width. A number of cottages or camps are built along the shores, and three or four small brooks empty into it. Outside of the sections covered by water due to flowage the pond is of reasonable depth, although the maximum depth obtained did not exceed 33 feet. Some claim that it has an extreme depth of 40 feet or more. Two shallow sand bars extend across the pond at some distance apart. On July 1, when the pond was examined, the following temperatures were obtained: air, 80° F.; surface, 74°; at a depth of 24 feet, 56°; 33 feet, 54°. The pond is somewhat remarkable from having mostly hard bottom in the larger depths.

Wachusett Lake, Westminster: This is a long, fine sheet of water, and on one side of the lake is a park for the accommodation of the public, which it is understood is owned and controlled by the local electric road company. The pond is apparently between two and three miles long, and is chiefly noted for catches of pout or catfish. Yellow perch are also plentiful, and black bass are said to be in fair abundance, but not usually inclined to take a hook. No lily pads or other aquatic growth were observed. The size of the pond, we were informed, has been considerably extended by flowage, although it is believed to be naturally a great pond of the State. In

addition to the fish already mentioned, there are pickerel and sunfish. The bottom is generally soft in the middle and deeper parts, although there are patches of hard bottom. On July 24, when this pond was examined, the following temperatures were obtained: surface, 71° F.; in a depth of 10 feet, 70°; and 18 to 24 feet, 60°. The last-mentioned depth was the maximum obtained.

North Pond, Milford: This is apparently a flowed pond, about a mile and one-half long and of varying width, though generally not exceeding a quarter or a third of a mile in breadth. There are many coves with corresponding headlands jutting out into the pond, which in places make it rather narrow. Along its shores are several camps, which are more or less occupied in summer. The principal species of fish are pickerel, which are reputed to be plentiful, yellow perch, catfish, sunfish and shiners. The bottom of the pond is apparently soft throughout; nevertheless, no pond lilies or other aquatic vegetation were observed. The absence of any vegetation of this kind is probably due to the recent flowage of the pond by reason of the raising of the water through the building of a new dam. At the time the pond was examined, on July 15, the following temperatures were secured: air, 76° F.; surface of water, 70°; at a depth of 18 feet, 63°; 20 feet, 61°; and 21 feet, 60°.

Long Pond, Royalston: This pond is apparently about one mile long, with the land coming down steeply to it on one side, and somewhat lower, with stretches of bold shore, on the opposite side. There are a few camps along the shores of the pond, which is shallow, and chiefly celebrated for pout or catfish; there are also pickerel, yellow perch and sunfish. Pond lilies occur in greater or less numbers over a large part of the pond, but in some places are either submerged or not numerous. The bottom is muddy, and generally covered with aquatic grass. On July 25, when it was examined, the following temperatures were obtained: air, 78° F.; surface of water in middle of pond, 73°; at a depth of 9 and 10 feet, 64°, the latter depth being the maximum secured.

White Pond, Concord: This is a handsome sheet of water, nearly elliptical in form, about three-eighths of a mile long and

a quarter of a mile wide. It has generally bold shores, while the bottom falls off steeply, so that there is comparatively deep water not far from the land, at least in many places. The water is remarkably pure and clear, so that the bottom can be seen at a considerable depth. No aquatic vegetation, such as grasses or lily pads, was observed at the time this pond was examined, on August 4, and doubtless the absence of vegetable spores accounted largely for the unusual clearness and purity of the water. There are three camps on the banks of the pond, which are favorite resorts in summer, and sometimes in winter, for those who own them. The principal species of fish are yellow perch and pout, or catfish. The yellow perch are reputed to be small, as a rule, and the catfish are far from numerous. No information of pickerel being in this pond could be obtained. The shores or beaches around this pond are generally composed of small stones, gravel and sand, and the bottom for some distance out from the shore is composed of the same materials, although in some places in the deeper sections there is soft mud. It is a matter of record that this pond has an extreme depth of 65 feet, although no greater depth than 60 feet was found when the examination was made. The following temperatures were obtained: air, 66° F.; surface, 72°; at a depth of 17 feet, 72°; 29 feet, 70°; 32 feet, 68°; 40 feet, 66°; and 58 to 60 feet, 62°.

Milford Pond, Swansea: This is a rather narrow, elongated artificial pond, it having been flowed for manufacturing purposes many years ago. The shores are rocky in some places and sandy in others. The bottom of the pond, except near the shores, is muddy. So far as observed, there are no camps or cottages along the shores of this pond. The principal species of fish are pickerel, white perch and catfish, the latter being plentiful, but pickerel appeared to be scarce; there are also a few sunfish. The pond is shallow, not exceeding eight feet in depth being obtained. The following temperatures were secured on July 31, when the examination was made: air, 76° F.; surface, 76°; and at a depth of 8 feet, 74°.

Echo Lake, Princeton: This is a small, artificial pond, not exceeding two or three acres, on the State Reservation at Wachusett Mountain. So far as could be learned, pickerel are the

principal species of fish there, although there are some catfish or pout. There was not available any boat to go out on this pond, consequently all observations were made from the dam, where the bottom fell off quickly. The bottom is evidently muddy, and there is some aquatic growth. The following temperatures were obtained on July 24, when the pond was examined: air, 72° F.; surface of pond at shore, 80°; and at a depth of from 4 to 6 feet, 74°.

Bolton Pond, Princeton: This is a small, artificial pond, on the State Reservation on the opposite side of Wachusett Mountain from Echo Lake. It probably does not exceed three acres in extent. The only species of fish in it, according to Mr. Chase, superintendent of the reservation, are pickerel and pout. The pond is apparently fairly deep for its size, but no boat being available, the maximum depth could not be obtained, and the best that could be done was to make observations from the dam. The surface temperature there was 74° F.; and at a depth of 5 or 6 feet, 68°.

Lake Winthrop, Holliston: This is a pond of considerable size, being nearly a mile in length and about one-half mile extreme width. In places around the pond there are elevated wooded points or stretches of shore, and cleared plateaus interspersed with low, swampy sections. On the whole, the pond is rather pretty and attractive, and so near Holliston village that it is easily within the reach of residents who resort to it for bathing and fishing. While there are no cottages or camps around the pond for fishing, there is a booth-like structure which was formerly used for dancing, while the adjacent grounds were used for picnics. We understood that it was less used than formerly. Around the shores of the pond in shallow places are more or less lily pads and other forms of aquatic growth. The principal species of fish in this pond are pickerel, yellow perch, catfish or pout, sunfish, and a few shiners. Fish, we understand, are not generally plentiful. The pond was stocked with pike perch in the spring of 1903. The shores are diversified by patches that are rocky and marshy. The pond has three little islands in it. The bottom is mostly soft mud, apparently without vegetable growth. At the time it was examined, on July 10, the follow-

ing temperatures were obtained : air, 92° F. ; surface, 86° ; at a depth of 6 feet, 77° ; 9 feet, 72° ; 12 feet, 65° ; and in 16, 17 and 19 feet, from 63° to 64°.

Spectacle Pond, Littleton : This is a fine pond of considerable extent, and is seemingly a favorite resort of people in summer. There are four camps, so called, embracing eight to ten small structures, altogether. The principal species of fish are pickerel, yellow perch, pout or catfish, sunfish or roach, and a few shiners. This pond is remarkable in having the lowest temperature of any similar body of water examined by this commission. On August 11, the date when the examination was made, the following temperatures were obtained : surface, 74° F. ; at a depth of 9 feet, 62° ; 16 feet, 56° ; 23 feet to 25 feet, 52° ; 27 feet, 51° ; 30 feet, 48°. The maximum depth obtained was 30 feet. As a rule, the water is remarkably clear and free of aquatic vegetation, although there are a few lily pads or other aquatic grasses near the shores in some places. The beaches are mostly small pebbles, stones, gravel and sand, while the bottom is chiefly soft mud, although there are here and there hard patches of stone or gravel. A brook flowing through a pond in Ayer leads into this pond at its head, and there is also another small brook that empties into it. It has an outlet which connects it with Forge Pond. The banks are steep in places, and the bottom falls off abruptly here and there, although in some parts of the pond it slopes off very gradually, and is rather inclined to be shallow than otherwise.

Forge Pond, Westford : This is a pretty, natural pond, the size of which may have been increased moderately by flowage, for there is a small dam 8 or 10 feet long at the outlet. It is now more than a mile long. Forge Village is on one side of it, where also is a large ice house, while numerous small cottages or camps have been built along the other sides of the pond. The shores of this pond are well wooded for the most part, and generally bold, rising steeply from the water for long stretches. There is apparently little aquatic plant life, unless perhaps in some shallow places here and there. The principal species of fish are pickerel, yellow perch and catfish, all of which are reputed to be fairly plentiful ; there are also sunfish

and shiners. A brook which runs from Spectacle Pond empties into the head of this pond. On August 11, at which time Forge Pond was examined, the following temperatures were obtained: surface, 70° F.; at a depth of 18 feet, 65°; 22 feet, 63°; 28 and 30 feet, 60°. The maximum depth obtained was 30 feet. The beaches for the most part are composed of small stones, pebbles, gravel and stone, and this character of the bottom extended out some way from the shores, although only soft mud was found in the greater depths.

Hart Pond, Chelmsford: This is a flowed pond of considerable size, and one which was flowed many years ago for manufacturing purposes. So far as records are obtainable, it was first flowed in the seventeenth century; and we have yet been unable to find any records establishing the fact that it was originally a pond, or at any rate a pond exceeding twenty acres in extent. It is said to be controlled by parties in Lowell, known as the "Butler heirs." The principal species of fish are pickerel, yellow perch, pout and sunfish, all of which are reputed to be fairly plentiful; there are likewise a few black bass. There is a dam on one side, and a few camps or cottages are scattered here and there around the shores of the pond. On August 14, at which date this pond was examined, the following temperatures were obtained: surface, 78° F.; at depths of 8 and 12 feet, 70°. The latter was the maximum depth obtained from numerous soundings. The bottom is apparently soft mud all over the pond.

Laurel Lake, Lenox: In many respects this pond, situated in the most beautiful part of Berkshire County, and surrounded by fine estates and elegant summer homes of wealthy people who have been attracted there by the beauties of the region, is one of the most interesting and charming spots in the State. Generally speaking, the land rises rather steeply from the pond, more or less of it being wooded, while long stretches of well-kept lawns and fields are seen in many directions. The shores are generally rocky, and the bottom of the pond as a rule falls away steeply to depths of 20 to 25 feet near the shore; showing that, although the level of the pond has been raised some twelve feet or possibly more by the building of a dam at its outlet, the area has not been increased to the extent

which is common with ponds that have been flowed. The pond is about two-thirds to three-fourths of a mile long, and approximately two-thirds as wide as it is long. There are one or two small brooks that run into it. The Smith Paper Company of Lee use and control the water of this pond for manufacturing purposes; but, inasmuch as it was originally a great pond of the State, it would seem that they have no control over the fishing therein. The principal species of fish are pickerel, black bass (which have been introduced), yellow perch, catfish, carp, sunfish and shiners. It is said that the pickerel seldom grow large, but that they have an exceedingly fine flavor, being superior to fish of the same species taken in some other waters. It is claimed that formerly they were plentiful, but that recently there is an apparent scarcity of this species. This alleged scarcity has given rise to many surmises as to the cause, some attributing it to the presence of carp, and others to a great abundance of shiners, the latter believing that the abundance of natural food makes the pickerel indifferent to bait or lures of other kinds. It is possible that the presence of black bass in this lake may have caused a scarcity of pickerel, as in some other ponds. Except in some of the shallow coves which have been flowed by the rise in the pond, due to putting a dam at its outlet, the bottom is apparently hard throughout, being probably composed of gravel, pebbles and stones of greater or less size. In the shallows the bottom is muddy, with a growth of pickerel weed or other aquatic grasses. Where the pond is deeper there is no grass of any kind, and the conditions of bottom and water are such as to suggest peculiar fitness of the lake to the existence and growth of such of the game species as require gravelly bottom for spawning, and a comparatively low temperature of water. On the occasion when this pond was examined, September 11, the following temperatures were obtained: surface of lake, 68° F.; at a depth of 8 feet, 68°; 20 feet, 65°; 27 feet, 56°; 38 feet, 53°; and 50 feet, 49°. The maximum depth obtained was 50 feet.

Shaw Pond, Becket: The land surrounding this pond is generally steep and well wooded, but there are a few low places here and there. There is yet only one camp on the

bank of the pond, but it is probable that coming years will see the establishment of a number of others. Pickerel and yellow perch are reputed to be abundant, and also bullheads or catfish are in good numbers. Eels are numerous, and occasionally in winter, when fishing through the ice, the anglers get a large trout. The latter are supposed to come into the pond from the two brooks which empty into it. As a rule, the bottom is soft mud, with a profusion of aquatic grass, and around the shallows are pickerel grass and lily pads in summer. There are, however, reputed to be some patches of gravelly bottom. The maximum depth obtained was 16 feet, so it will be seen the pond is shallow, as a rule generally not exceeding 8 to 12 feet. When visited, on September 9, the following temperatures were obtained: surface, 62° F.; at depths of 12, 15 and 16 feet, 60°.

Benton Pond, East Otis: Having learned, on September 9, when Shaw Pond was visited, that no boat could be obtained at Benton Pond to make a satisfactory examination, it was decided not to visit it.

Greenwater Pond, Becket: This is a fine pond, with clear water and beautiful surroundings, although little has been done yet to change natural conditions, if we except the fact that a dam has been placed at the outlet of the pond, which has raised it about 8 feet and added considerably to its area, which was quite extensive previously, enough so, at least, to bring it easily above the size required to make it a great pond of the State. The land surrounding the pond is mostly steep and wooded, with shores diversified by stretches that are rocky, pebbly or gravelly, as a rule. In the shallow portions of the pond, which are mostly those that have been flowed by raising the water, there are lily pads and pickerel grass; but where the pond is deeper, especially where it falls off steeply from the shores, there is a scarcity or absence of aquatic vegetation. There is a club house situated on a bank of the pond in a very pretty location. Extending almost entirely across the pond opposite this club house is a bar composed of gravel, pebbles and stones, over which there is a depth of about 2 feet. This marks the limit of the natural pond, and all north of it, where the water is about 7 or 8 feet in depth,

has been flowed, while in the other parts of the pond there is a much larger depth. There are two or three small brooks which run into this pond, but some of them, at least, dry up in summer. The principal fish are pickerel, black bass, catfish and yellow perch. Pike perch fry were put into the pond in the spring of 1903, and are reported to have been seen in considerable numbers during the summer. Sunfish and shiners are also reputed to be abundant. Pickerel and black bass are said to be fairly plentiful, and larger than they are usually found. Except in the shallower parts of the pond, where the water has been raised by flowage and where the bottom is soft, the bottom of this pond is composed of gravel, pebbles and stones, and affords most satisfactory conditions for the spawning of certain species of fish,—notably any of the Salmonidæ, the pike perch, etc. When this pond was visited, on September 9, the following temperatures were obtained: surface, 64° F.; in a depth of 24 feet, 63°; 31 feet, 62°; 38 feet, 56°; 43 feet, 53°. The fact that temperatures of 56° and 60° were obtained in a depth of 48 feet, which was the maximum depth secured, indicates that there is a diversity of temperature at the bottom of this pond, due probably to the fact that it is fed more or less by springs. There is as yet only one club house on the shores of the pond, that belonging to the Passumpsic Club, but presumably future years will show a considerable addition of camps or club houses in this section.

Hampton Pond, Westfield and Southampton: This is an attractive natural pond, about one and one-fourth miles long, but bent at almost right angles, so that from any point of view it does not really appear so long as it is. It is connected by a navigable channel for boats with Horseshoe Pond. It is a favorite resort for the people from the large towns within easy reach of it, and particularly those from Westfield and Holyoke. On its banks are a pavilion and several camps or cottages. The Pequoit Club of Holyoke has a club house on a little island in the centre of the pond. It is a very pretty place, and is said to be much patronized by members of the club and their friends. The shores of the pond are generally well wooded, and in some places they are rather steep, but nowhere high.

The beaches are of sand, gravel, pebbles and stones, and the bottom throughout partakes of this character, being hard and clean, but mostly covered with aquatic grasses. The principal species of fish are pickerel, black bass, yellow perch, catfish, sunfish and shiners. There is a marked variation of statement regarding the abundance of fish; some claim that they are fairly abundant, and others that they are very scarce. The maximum depth obtained was 29 feet. At the time the pond was examined, on September 16, the temperatures were as follows: surface, 72° F.; at a depth of 13 feet, 72°; 18, 19 and 20 feet, 70°; 21 and 24 feet, 68°; and 29 feet, 65°.

Quabbin Lake, Greenwich: This is a fine, natural pond, nearly a mile long, with generally well-wooded banks. There are a few lily pads and more or less pickerel grass or other aquatic vegetation near the shores where it is shallow, or in the coves, but elsewhere there is no indication of vegetation in the pond. The banks are low in places, but elsewhere rise more or less steeply from the water. It has an inlet of considerable size, and an outlet as well. There is a hotel near it, called the Quabbin House, and numerous camps along its banks. The pond is fairly deep, and with low temperature at the bottom, although at the surface the temperature is warm enough for all practical purposes. The principal species of fish are yellow perch, catfish, shiners and a few eels. The pond has recently been stocked with pike perch by the State. These were put into the pond in the spring of 1901, and in the early summer of 1903 a specimen was captured which weighed one and three-quarters pounds. The bottom appears to be diversified with patches of mud and hard sand or gravel; as a rule, however, the bottom is composed of soft mud in the deeper parts. On September 17, when the pond was examined, the following temperatures were obtained: surface, 70° F.; at a depth of 27 feet, 60°; at a depth of 30 feet, 58°; 40 feet, which was the maximum depth obtained, 54° and 56°. The temperature seemed to vary somewhat at the same depths, due apparently to the presence of springs in some localities. This pond is interesting from the fact that an application has been made to restock it under the new law, which permits of such action, and also because those most interested claim that the

supply of fish in the pond has been materially improved by the protection given within the last three years, — so much so that the number of summer residents is increasing to such an extent that the size of the local hotel is being doubled at the time this is written.

Warner Pond, Greenwich: This is a rather small pond, probably not being more than fifty acres in extent. The banks are well wooded all around the pond, which has in several places white sandy beaches. There are no camps. Evidently lily pads are numerous during the warmer part of the summer, and at the time the pond was examined pickerel grass was still abundant. The principal species of fish are pickerel, yellow perch, catfish, sunfish and shiners. When the pond was visited, on September 18, the temperatures obtained were as follows: surface, 70° F.; and at a depth of 17 feet, which was the maximum depth secured, 68°. The bottom is soft mud throughout, and was covered thickly with pickerel grass.

Curtis Pond, Greenwich: This is a pretty, oval-shaped pond, about three-fourths of a mile long by one-half mile wide, and has one rather sluggish inlet running into it, and also an outlet. The banks are almost in a primeval condition, being well wooded down to the shores. A camp was being constructed at the time the pond was visited, but this is the only residential structure around the pond. The latter has only a few lily pads and some pickerel grass in shallow spots along the shores or in the coves, more particularly at the upper and lower ends of the pond. The shores are generally composed of sand, gravel or pebbles. Generally speaking, they are not steep, but in a few places the land rises somewhat abruptly but not to a considerable height. The pond is alleged to have a depth of 90 feet, but a very careful examination of it failed to develop a greater depth than 35 feet. The principal species of fish are pickerel, yellow perch, catfish, sunfish and shiners, of which none are abundant, according to local report. When the pond was visited, on September 18, the following temperatures were secured: surface, 64° F.; at a depth of 25 feet, 60°; 33 and 35 feet, 56°. As a rule, the bottom is hard sand, gravel and pebbles, but in some places it is of soft mud.

Neck Pond, Barnstable: This pond is situated near the village of Osterville. It is probably fifty or sixty acres in extent. It was visited on October 7, but could not be examined, for the reason that no boat was obtainable.

*Work of the United States Fish Commission.** — While the aggregate output of fish fry from the hatcheries of the United States Fish Commission on the coast of this State was not excessively short of that of last year, there was an extraordinary falling off in the production of cod fry, — from 212,001,000 in 1902 to 87,392,000 in 1903. The output of flatfish fry amounted to 77,292,000 more than in 1902, while considerable quantities of fry of other species — tautog, scup, mackerel and sea bass — that were not reported as having been hatched last year were added to the result of 1903.

The remarkable decline in cod fry, which is important in the attempt to restore the primitive abundance of cod off our shores, was due to an unusually small catch of cod on the shore grounds. This decline in catch was attributed chiefly to very unfavorable weather for fishing, although it is probable that a scarcity of fish prevailed in the waters near the coast, so that the results secured on the days when fishing could be prosecuted were not as satisfactory as they should have been. There was also a considerable decrease from the previous year in the lobster fry obtained. This change was wholly at the Gloucester station, which is the chief lobster-hatching point in the State, and was due to unseasonable gales and heavy seas, that destroyed many lobster pots and temporarily delayed fishing. The output of lobster fry from Woods Hole, which has never been large in recent years, was slightly increased this year. This was because no fry were reserved, as last year, for experimentation, and also because in one of the districts where egg-bearing lobsters were collected better success than usual was met with. Reference is made to the chapter on lobsters for detailed facts and figures relating to this matter.

The production of flatfish fry is largely if not entirely de-

* This Bureau, which was formerly independent, has been incorporated with the department of Commerce and Labor, and now has the official designation of "Bureau of Fisheries."

pendent upon the attention that can be given to this particular branch of fish culture. There is seldom if ever any difficulty in getting any needed supply of eggs of flatfish, and, as the hatching of them is not difficult, the magnitude of the result is limited chiefly by the available facilities and force for the work. It was not very long ago when the artificial propagation of flounders or other flatfish that occur in our littoral waters would have been deemed unwise and an unprofitable effort. But conditions have changed; flatfish are becoming more highly appreciated for food than ever before; the market demand for them is increasing in consequence, and already a beam trawl fishery for the capture of these species has developed at Cape Cod; efforts are being made to introduce the more effective otter trawl, and the industry of catching flatfish is assuming proportions of importance, with a prospect of still greater development in the near future. In view of all this, the artificial propagation of the species which furnish the object of this developing industry is timely, and worthy of continuance on the largest scale possible.

The experiments with the mackerel (*Scomber scombrus*) and various other species are interesting, and it is certain that whatever can be done to increase the supply of such species as the sea bass, scup and tautog off our south-eastern shores, where they most abound, should be encouraged and appreciated by our citizens.

The statements that follow — including those relating to the lobster — show that the total production of fry at the two coast stations was, approximately, 395,288,000, which was less than the aggregate of 1902 by 62,848,000. Of the total product, 365,916,000 fry were planted in the coast waters of this State. Of these, 245,425,000 were flatfish, 87,392,000 were cod, 25,751,000 were lobsters,* 5,867,000 were tautog, 920,000 were sea bass, and the balance were nearly equally divided between scup and mackerel.

The following detailed statement, furnished by the Bureau of Fisheries, Department of Commerce and Labor, shows with

* Of the lobster fry planted in the waters of this Commonwealth, 4,624,000 were hatched from eggs "taken outside the State."

exactness the number of each species (other than lobsters) planted at certain points along the coast of this State, also the totals put out from each hatchery : —

Statement of Cod and Flatfish hatched and planted in Massachusetts Waters by the Gloucester and Woods Hole Stations of the United States Commission of Fish and Fisheries, during the Fiscal Year ended June 30, 1903.

SPECIES AND DISPOSITION.	Fry.
<i>Cod.</i>	
Woods Hole great harbor, Woods Hole, Mass., . . .	306,000
Vineyard Sound, off mouth Woods Hole harbor, Mass., .	1,103,000
Vineyard Sound, off Jobs Neck, Mass.,	2,570,000
Vineyard Sound, off Tarpaulin Cove, Mass.,	31,061,000
Vineyard Sound, off Robinsons Hole, Mass.,	9,088,000
Vineyard Sound, off Nobska Light, Mass.,	11,492,000
Vineyard Sound, off Quicks Hole, Mass.,	3,018,000
Vineyard Sound, off Woods Hole, Mass.,	1,082,000
Buzzards Bay, north Robinsons Hole, Mass., . . .	2,483,000
Buzzards Bay, west of Weepecket Island, Mass., . .	1,380,000
Hadley Harbor, Gosnold, Mass.,	316,000
Atlantic Ocean, Gloucester, Mass.,	23,493,000
<i>Flatfish.</i>	
Woods Hole great harbor, Woods Hole, Mass., . . .	59,148,000
Woods Hole little harbor, Woods Hole, Mass., . . .	707,000
Eel Pond, Woods Hole, Mass.,	7,402,000
Hadley Harbor, Gosnold, Mass.,	5,870,000
Waquoit Bay, Waquoit, Mass.,	11,258,000
Atlantic Ocean, Gloucester, Mass.,	149,666,000
Atlantic Ocean, Manchester, Mass.,	11,374,000
<i>Tautog.</i>	
Vineyard Sound, off Parkers Point, Mass.,	519,000
Woods Hole great harbor, Woods Hole, Mass., . . .	4,983,000
Buzzards Bay, Long Neck, Mass.,	365,000
	5,867,000

SPECIES AND DISPOSITION.	Fry.
<i>Scup.</i>	
Woods Hole great harbor, Woods Hole, Mass., . . .	280,000
<i>Mackerel.</i>	
Buzzards Bay, off Long Neck, Mass., . . .	106,000
Woods Hole great harbor, Woods Hole, Mass., . . .	175,000
<i>Sea Bass.</i>	
Woods Hole great harbor, Woods Hole, Mass., . . .	904,000
Vineyard Sound, off Parkers Point, Mass., . . .	16,000
	920,000

The scope and importance of the fish cultural effort on the coast of this Commonwealth, as detailed above, is too apparent to require discussion to emphasize it. Allusion will be made elsewhere to fry and eggs of fresh-water species which have been furnished this State by the United States Fish Commission to stock our interior waters.

Fishways; Need of Legislation. — In view of the fact that the establishment of a fish commission in Massachusetts was for the special purpose of determining what should be done to make possible the passage of migratory fish over the obstructions in our rivers to the spawning grounds at the head waters thereof, also that the attention of the commission was for several years thereafter devoted chiefly if not exclusively to building fishways, it is certainly remarkable that the laws appear to be so deficient with some exception that, as they stand on the statute books to-day, they are ineffective, so far at least as possessing any vitality to cause the building of a fishway where none has been previously built, however much it may be needed for the passage of fish.

The decision of the legal department of the Commonwealth shows conclusively that, aside from furnishing authority to compel the repair of a fishway, which because of age or accident has become useless, the laws relating to fishways are powerless. It will, therefore, be necessary to enact a law giv-

ing to the commission the authority to compel the building of a fishway where one is required, unless the public prefer to abandon this line of effort as a means of securing the restoration and increase of migratory fish in our streams and ponds. The continuance or abundance in our waters of certain species which are valued as food, as the object of an important industry, as bait to enable the prosecution of other great fisheries, or as a means for recreation to the sportsman, is a matter of greatest consequence, and cannot be lightly set aside. It is assumed that the simple mention of present conditions will be sufficient to insure legislative action; for it is not anticipated that an effort which has been continued more than three decades by this State, the example of which has been followed by almost the entire nation, will be abandoned now. But, should nothing be done, the attempt made the past two years to stock our rivers with shad and to secure a greater abundance of river herring must cease, with the result that it may never be resumed, or, if so, under conditions far less favorable than those now existing.

For two years the commission has been endeavoring to get a fishway built over the dam on Acushnet River, near New Bedford. The owner of the dam refused to erect a fishway, and finally, after the failure of negotiations and orders to accomplish the desired object, the matter was placed in the hands of the Attorney-General to deal with. The outcome is embodied in a letter from the legal department; and it is worthy of consideration that the issue thus brought to the notice of the Legislature and the public is not alone whether this particular fishway shall be build, but whether any other fishway shall be erected in Massachusetts. Following is the letter from the Assistant Attorney-General, and its findings are sufficiently explicit to speak for themselves:—

COMMONWEALTH OF MASSACHUSETTS,
OFFICE OF THE ATTORNEY-GENERAL, BOSTON, May 26, 1903.

Capt. J. W. COLLINS, *Chairman, Fisheries and Game Commission.*

DEAR SIR:—In preparing to try the case of Collins *et al.*, Commissioners, *v.* Hamlin, which is a suit in equity to compel the defendant to comply with an order of your Board purporting to

require him to build a fishway over his dam in the Acushnet River, I have come to the conclusion that the suit must be unsuccessful.

I brought the petition under R. L., c. 91, § 9, assuming that the section authorized your Board to order changes in any dam upon a river where fishways are required by law to be maintained, so as to make them suitable for the passage of fish. But an examination of the history of the statute makes it clear that the authorized method of procuring a fishway over a dam, which, as in the present case, has never contained a fishway, is for your Board to construct it at the expense of the Commonwealth, if, in your opinion, the owner is unable to afford the expense; otherwise, at the expense of the owner. (St. 1869, c. 384, § 4; P. S., c. 91, §§ 7, 8; St. 1900, c. 344; R. L., c. 91, §§ 12, 13.) It is only in case of an existing fishway that the Board, at its option, may order suitable changes, or make the changes itself. (St. 1867, c. 344; P. S., c. 91, § 4; St. 1899, c. 103; R. L., c. 91, § 9.) The penalties for not maintaining a fishway also apply only to an existing fishway. (St. 1867, c. 344.)

The suit concerning the Wyman dam at Middleborough, in which your Board was successful, compelled the restoration of an existing fishway under the above statutes. The case of the Holyoke Water Power Company, 104 Mass. 446, in which the defendant was compelled to build a new fishway, was brought under the special statute, 1869, c. 422, which was applicable only to the Merrimac and Connecticut rivers. I find no such statute concerning the Acushnet River.

I advise, therefore, that the present suit be abandoned.

Yours very truly,

FREDERICK H. NASH, *Assistant Attorney-General*.

It is of large importance that, in the event of building additional fishways, the utmost care shall be exercised to secure their proper location, as well as their suitable construction, in order that the public may receive the largest benefit in consequence of the action taken. Unfortunately, it sometimes happens that a fish ladder is so badly located that the object of building it is entirely defeated, and, as a result, its erection is worse than useless, for those ignorant of the real cause of inefficiency are liable to ascribe it to some other cause than the right one, much to the prejudice of fishways as a means for fish to pass over dams on their way to spawning grounds at the head waters of streams.

The Lawrence fishway is a noteworthy example of making

such a structure useless, even when it is built at large expense. The writer has examined it on several occasions, and is of the opinion that either it should be abandoned as worthless, or that it should be rebuilt in another location as soon as the laws will permit.

The foot of the fishway is in close proximity to the outlet of a sewer, which pollutes the river at that point to such an extent that one may marvel that even a lamprey eel enters it. Indeed, there were not many of them that made the venture this year. Superintendent Thomas S. Holmes reports that: "Lampreys appeared in the Lawrence fishway May 15. There were very few of them, and none were seen after June 17. The only other fish seen were a very few suckers, chubbs and silver eels."

This is not strange; the wonder is that any fish were seen in or near the fishway, for not only is the water contaminated, but the lower end of the fishway is out of the water a large part of the time, — that has been its condition whenever seen by the writer.

Inasmuch as the commission is usually considered responsible for the proper location of fishways, as well as for their satisfactory construction, the Board in authority at the time the Lawrence fishway was built will doubtless be held accountable for its present unsatisfactory location, which has effectively defeated the purpose of its erection. However that may be, it is evident that the commission should now be authorized by law to have fishways built where they are required for the continuance of fish life in our streams.

Prevention of Stream Pollution. — The prohibition of stream pollution, in accordance with section 8, chapter 91, Revised Laws, has at no previous time received the same degree of comprehensive attention as during 1903, although this subject has been one of the matters for investigation and action to which the chairman has given his personal attention during the past few years, when the Legislature was not in session. The importance of this work is so great that an effort was made this year to nearly complete it, and it is supposed that little now remains to be done to insure our fish-bearing streams against the menace to their usefulness that

they have been exposed to for many years. The result of this work is as follows: in 1900 orders were sent to 15 mill owners; in 1901, to 24; in 1902, to 24; and in 1903, to 27. This makes a total of 90 orders prohibiting the discharge of sawdust into streams that have been sent out in four years; and when consideration is given to the fact that, with slight exception, these mills and the streams on which they are located have been personally examined by the chairman before other action was taken, it will be seen that much effort has been devoted to the object of securing purity of waters, especially if thought is given to the fact that the same firm or individual may have more than one mill; that the number of mills visited and affected by orders exceeds the number of the latter; also that this is only one of many duties that demand the personal attention of the commission.

There is a difference of opinion as to the effect of sawdust on fish life, and those interested in mills maintain, with rare exception, that it does no harm. The means have not been available for us to enter into a scientific investigation of the matter, so as to place the determination of the question beyond doubt. It is fortunate, however, that we are able to quote some of the results of a scientific investigation of this subject (space does not permit extensive quotation); and the conclusive nature of these will, it is hoped, demonstrate the wisdom of the law making it possible to prohibit sawdust pollution, as well as the necessity for the vigorous enforcement of the law.

In a report on the effect of sawdust on fish, A. P. Knight, professor of animal biology, Queen's University, Kingston, Can., makes the following statements, among others, which prove beyond question the poisonous nature of water-soaked sawdust:—

When sawdust was allowed to lie in still water, or in very slowly running water, . . . the most disastrous effects followed the immersion of different animals in the poisonous mixture. Not merely did adult fish die in it, but fish eggs, fry, aquatic worms, small arthropods, animalcules and water plants. Nor was the cause of death due to suffocation from lack of oxygen, because when air was made to bubble rapidly through the solution the final results were the same, the only difference being that death was somewhat delayed. No one

could paint too vividly the deadly effects of strong solutions of pine or cedar sawdust when soaked in standing water. Adult fish died in two or three minutes; fish eggs in a few hours; fry and minnows in from ten to fifteen minutes; aquatic worms and insects, eight to twenty-four hours; aquatic plants, a few days. Every living thing died in it, and if one were to judge of its effects by laboratory experiments alone, then the prohibitory legislation needs no better defence.*

Professor Knight experimented with perch eggs in a clean aquarium into which a bag of sawdust had been put. The lower strata of water was affected by the sawdust, but higher in the aquarium the water was clear. "Four batches of eggs were placed in the aquarium at 10 A.M. of the 13th of May," says Professor Knight, "viz., two batches on the very bottom of the aquarium in the brownish water impregnated with a solution from sawdust, and two on the surface of the bag of sawdust, well within the clear water. Next morning at 9 A.M. every egg in the yellowish-brown water was dead, and every egg in the clear water was alive. Assuming that the brownish water was a saturated solution of material extracted from sawdust," continues Professor Knight, "two other solutions were made from it, one of 25 per cent. and one of 50 per cent. strength in tap water. Fresh batches of eggs were placed in each of them. In twenty-four hours the eggs in the 25 per cent. solution were all alive, half of those in the 50 per cent. solution were dead. In twenty-four hours more some of the fry had hatched out, but eggs and fry in both solutions were all dead."*

Experiments were also made to determine if these results were "due to lack of oxygen, rather than to poisonous extracts dissolved from the wood," and the water was charged with air. The same result was obtained. Professor Knight says: "The conclusion, therefore, is quite clear. The eggs were killed, not by lack of oxygen in the water, but by the poison contained in the water, and evidently dissolved out of the sawdust."

This is in absolute harmony with our observations of the effect of sawdust on fish life in streams, and the convincing

* "Forest and Stream," Oct. 24, 1903.

results of these scientific experiments should have their proper weight.

Orders prohibiting the discharge of sawdust were sent to the following mill owners during 1903: Clifford F. Brochu, Monterey; B. E. Parkhurst, Dunstable; Everett E. Tarbell, L. Sartell & Son and Henry W. Shattuck, Pepperell; A. A. Flint, Tyngsborough; Joseph Small, Warren E. Marble, Cyrus A. Jefts, S. E. Sherbert and Nathaniel Sarsfield, Ashburnham; L. E. Flint, S. E. Buxton and A. M. Wilder, Ashby; Joseph F. Thompson, Townsend; Nelson W. Wyman, Wilder P. Clark, O. L. Mann, Clarence A. Brooks, Elisha M. Whitney and Charles C. Carter, Winchendon; George C. More, Westford; Walter Blanchard, Plympton; David Parlin and John A. Carter, Dana; Edward E. Whitney, New Marlborough; Walter R. Dean, Oakham.

In several cases other mills were visited, but it was found that the owners of them were so fully complying with the law for the prevention of sawdust pollution that it was not deemed necessary to send them formal orders, especially since they readily undertook some slight changes that were required. The fact that the demand for and utilization of sawdust are increasing materially helps considerably in the enforcement of the law relating to pollution, while the absolutely fair and impartial treatment accorded by the commission has promoted a feeling of confidence and respect in suburban sections that is satisfactory. In one instance, that of John Vanstone of Prescott, the commission temporarily suspended an order, upon proper representation, with the understanding and agreement that the mill should not be operated at all after 1903. In some instances saw-mill owners have promptly seen the advantage to themselves of prohibiting the discharge of sawdust, for they have comprehended the effect not only on fish life, but on people who may be attracted to a region by improved fishing, thus benefiting materially the locality to which they resort in summer, by furnishing a market for lumber to build dwellings, likewise a market for real estate, labor and products.

Death of Fish because of Supposed Pollution. — During the late spring and early summer numerous complaints were

received of the death of large numbers of fish in various fresh waters, notably in streams or ponds through which or to which the migratory species passed. The alewife seemed to be most largely affected by this mortality. It was noticeable, however, that fish of other species, and in ponds in the extreme western part of the State, suffered more or less. A thorough research into the causes of this mortality in different sections of the Commonwealth would doubtless have resulted in much information of scientific value; but the commission was not in a position, either as to men or material, to undertake an investigation of this kind, involving the employment of competent scientists for several months at the least.

Although it was appealed to most urgently to examine into this case and that, nothing could be done, for the simple reason that no money was available to pay for services of this kind. The suggestion that one of the deputy commissioners should be sent to look into the matter was prompted by a desire for something to be done, which was so intense that the fact was lost sight of that, aside from all of the deputies being fully occupied in the duties for which they are employed, only a trained and competent scientist would be capable of dealing with the problem of the cause of such mortality to fish, and no one of the law-enforcing force of the commission is known to have any scientific knowledge which would fit him for a task of this kind.

Under the circumstances, the commission was fortunately able to interest Dr. George W. Field in this matter, and he voluntarily gave such attention to some of the waters near the coast as circumstances permitted. While the conditions that caused the death of fish elsewhere may have varied from those he found, it seems fair to presume that the cause of mortality was more often due to lack of vitality in the water, because of pollution, than to anything else. Indeed, this may have been the exclusive reason. The degree to which streams and ponds may be polluted by sewerage and the discharge of acids and other deleterious ingredients into them from factories, etc., is surprising to those who have given no attention to this matter. In some States there are rivers completely fishless because of it. It is evident that the number of fish which could live com-

fortably and healthy in clear, pure water would become "an over-population," as designated by Dr. Field, when the life-giving qualities of the water have been exhausted by contamination. The results of Dr. Field's researches are given below, and are well worth the serious consideration of all who are concerned about the continuance of fish life in our waters: —

Preliminary Report upon the Cause of Death of Alewives in Mystic River and the Lower Mystic Lake during May and June, 1903.

June 9, 1903, 11.15 A.M. Rear of armory, Medford Square, Medford, Mass. Tide running up stream; about one hour to high tide. Many dead full-grown alewives in stream; a few but recently dead; the majority apparently dead from twenty-four to seventy-two or more hours; evidently carried down and up the river by successive tides. Counted fifty-four dead in an eddy perhaps fifty feet in circumference; two other eddies within three hundred feet where the dead fish seemed to be still more numerous. These eddies are certainly of greater area, but too far from shore for satisfactory observation. On a fair sample of fifty linear feet of shore counted sixteen dead and decaying alewives stranded by previous high tide; odor in the neighborhood was decidedly offensive from this source.

June 9, 12 noon. Harvard Avenue bridge over Mystic River, West Medford, Mass. Dead alewives passing under bridge at rate of four per minute. Immense numbers of living alewives swimming about, many of them spawning.

Lower Mystic Lake, 12.45 P.M. Lower end of lake thickly dotted with dead alewives. Perhaps two acres with on the average one dead fish to every square rod. Alewives spawning in immense numbers all about the shores, having crowded into the lower lake. Dissection of the recently dead fish disclosed no obvious direct cause; the spawn and milt had not been discharged; all organs seemed healthy and normal except the blood, which appeared to show indications of asphyxiation. I was therefore led to suspect that the amount of oxygen in the water was insufficient to maintain the vast multitude of alewives which enter the Mystic in May and June.

The above extracts from my field notes sufficiently indicate the general condition.

My observations at the fishway between the Upper and the Lower Mystic Lake showed that no fish were running; and, according to the statements of the attendants at the dam and at the boat house, the fish have not used this fishway for at least three years. This would indicate that while in years past the alewives used the Upper Mystic Lake and the upper stream as a spawning ground, they are at

present restricted to the much smaller area of the lower lake and to a few shallow portions of the Mystic River below the lakes. In addition, the numbers of individuals have probably increased since the use of nets in the Mystic waters has been suspended; and, finally, the gradually increasing contamination of the waters has reduced the amount of free oxygen in the water, and thereby limited the amount of animal life which can be supported. Here we have to deal with a case of a fish population which has become an over-population on account of an insufficient supply of oxygen in the water. The causes of this unnatural condition are the following:—

First, the dam between the upper and lower lake, which tends to restrict the breeding grounds, and thus leads to the accumulation of great numbers of fish in a much smaller area.

Second, the pollution of the water by manufacturing and other ways, which reduces the capacity of this water to maintain living organisms.

Third, the suspension of fishing by nets in the waters of the Mystic.

There is a peculiar connection between these three factors. The dam has shut the alewives from the pure upper fresh water reaches which they naturally seek, and restricted them to brackish water areas, where pollution is liable to be particularly fatal, on account of the supernatant fresh water, which prevents in some measure the oxygenation of the salt water below by preventing the access of the air to the salt water. So long as fishing was permitted, this condition of a population beyond the capacity of the water may have been obscured by the diminution of numbers to such an extent through fishing that practically all the remaining fish found sufficient oxygen in the water; but with the suspension of fishing the numbers of fish have become greater than can live in water which has its oxygen-containing capacity so impaired as has the Mystic.

This trouble during the presence of the alewives in the spawning migration is already an annual annoyance and expense to at least the towns of Medford and Arlington, and the cost of collecting and removing the decaying fish promises to increase each year. In view of these facts, I am led by this brief examination to suggest to the Medford board of health that the matter is one which might properly be referred to the State Board of Health and to the Commission on Fisheries and Game. Meantime, I offer suggestions for tentative consideration:—

First, that the attention of the Metropolitan Park Commission be called to the economic waste of fish which might well serve as cooked food, and to the consideration of the possible desirability of permitting within the areas under their jurisdiction the catching of alewives with

hand nets or with seines (not more than say twenty feet long) at certain definite points on the shores of the river and lakes, under proper restrictions. This might open to some classes an opportunity to get food fish at little expense by their own individual exertion. This might prove not only a practical aid to worthy people, but the process might be of interest to visitors, and a stimulus to the greater utilization of the park.

Second, as to the obvious pollution of the waters of the Mystic. This is an important and complicated problem, of which only one phase has been referred to; but the right solution of the entire problem is one of importance to all who live within the influence of these conditions.

With the increasing population the fish in our rivers and inland waters become of greater economic value to the people, and each year the number of instances of fish dying in vast numbers is multiplied. Many complaints of this character have been brought to my attention this year, including Massapoag Lake in Sharon, Assawampsett Lake in Middleborough, etc., but of these it has been only possible for me to make the above reconnaissance of the Mystic. The question is a very complicated one, and its solution requires a careful biological investigation.

Respectfully,

GEORGE W. FIELD.

The Boston "Globe" of Oct. 6, 1903, called attention editorially to "lake and river pollution." The following extract will show the tendency of the article and the urgency of the evil that calls for such public comment:—

The effects of river pollution on the supply of healthy fish for the nation are being felt more or less all over the country. Everywhere the complaint is growing, of widespread pollution through tons and tons of chemicals cast out by manufacturing plants into the lakes and rivers. The trouble is that in most cases the solution is not soluble. At some points in New York State the poisoned water has invaded the spawning grounds for bass, pike and pickerel, often causing tremendous destruction, and at other places the fish have been entirely driven away.

With . . . mill pollution at work in the great rivers, the people are beginning to demand that something be done.

Pond and Brook Fishing.—There is an unanimity of statement as to the increase in the size and abundance of fish in our

interior waters and a consequent betterment of fishing which leaves no doubt that much improvement has occurred. The numerous press articles which tell of catches seldom or never equalled in this State in recent years are fully verified by the careful observations of our deputies, many of whom claim that fishing in ponds and streams has been better in 1903 than at any time for many years. Not only have trout been more numerous in the brooks than for a long time, but the size of the fish has been extraordinary. Even in Berkshire County, where some claim trout seldom exceed six inches in length, the consensus of testimony shows much larger ones have been taken. Indeed, catches have been reported of trout weighing more than two pounds, and the writer can testify to seeing a lot of Berkshire brook trout that ranged from nine to sixteen inches in length.

But these allusions to the fish of our western county are only to emphasize the conditions, for reports of "big ones" and "large catches" have come from all sections of the State. Nor have these been confined to brooks alone, for fine fishing has been reported in the ponds and lakes stocked by the commission, wherein the fishing has been regulated and the destructive operations of ice fishermen have been prohibited.

In either case the result obtained indicates unmistakably what can be accomplished by liberal stocking and reasonable protection of our inland waters. While there are undoubtedly still occasional violations of law, and streams and ponds may be devastated by poachers, it is nevertheless true that little illegal fishing is now done, as compared with a few years ago. The result has been so advantageous to the law-respecting angler that there is now practically a universal desire to aid the commission in its protective work.

The demands on the commission to stock brooks and ponds are growing by leaps and bounds, as shown by the large number of brooks stocked this autumn with brook trout fingerlings, and also by the extraordinary number of ponds that fish have been put into. A few years ago it was customary to stock only a few ponds, perhaps six or eight; but this year the commission has stocked thirty-four ponds, a number which emphasizes the public demand and the strenuous effort made to

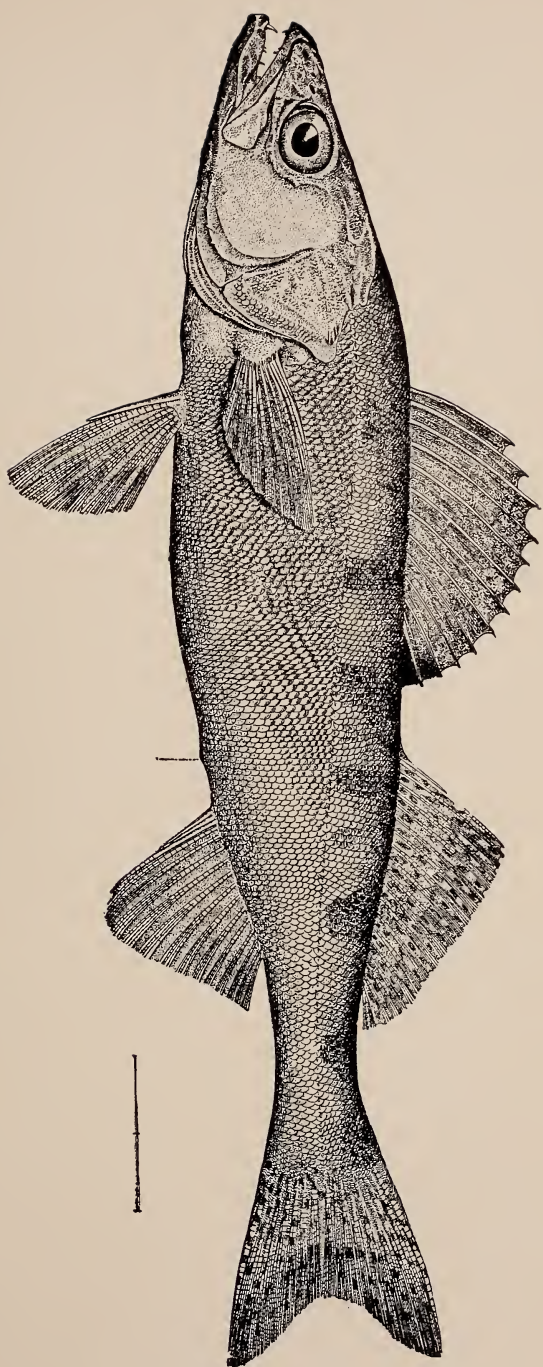
meet it, and to meet it in a way which, we trust, will secure the maximum good.

It is probable that the cold, rainy month of June, which was so fatally disastrous to birds, proved advantageous to fish life in the brooks. The latter, instead of being in danger of drying up to the degree that they have in other summers, or the water in them getting too warm at that season, were as a rule well filled with water that kept at a temperature throughout the summer that was more favorable than usual to the existence of brook trout. Although these conditions had no effect on the early spring fishing, they were, nevertheless, of large importance later, not alone as affecting the supply and catch toward the close of the season, but more especially because of their bearing on the prospective output of the brooks in 1904. The drought that followed after June might have caused much loss, except for the cold rains which preceded it.

While the press and personal notices of fishing which we shall venture to quote are all of a character to prove interesting, since they convey a comprehensive idea of actual conditions in every section of the Commonwealth, the statements which refer particularly to Berkshire County are remarkably noteworthy, for the reason that it has been held that that county should be exempt from the operation of the law prohibiting the capture of trout less than six inches in length, and, as a matter of fact, it is now so exempt because it has been believed by many that the trout in the western section of the State are seldom if ever longer than six inches.

It will be noticed that there are several reports of the appearance of the pike perch in the ponds where it has been planted. In one case fish of this species are reported as having been seen a foot long, but that they showed no inclination to take a hook. If this is so, there is reason for satisfaction: (*a*) because it indicates an abundance of live food in the pond, insuring rapid and healthy development; (*b*) it shows that the pike perch will live in our ponds; and (*c*) this indisposition of the fish to bite before fully matured gives greater assurance that they will escape untimely death by being caught before they have an opportunity for reproduction. There need be no anxiety on the part of any one about the pike perch taking a hook when it

STIZOSTEDION VITREUM. — Pike Perch or Wall-eyed Pike.



is larger. It will bite as freely and fiercely as any of the perches.

Accounts come to us, some of which are quoted in the following pages, which indicate that the rainbow trout is liable to do well in our ponds, although it is yet too early to expect much. Indeed, it would be better if none were caught until after they have spawned, though that cannot be expected.

Several instances of the capture of landlocked salmon have come to our notice. This is most gratifying and encouraging; it indicates that the plan of planting fingerling fish of this species has proved successful, and, taken with the fact that we have raised landlocked salmon to maturity at our hatcheries, the possibility of successfully stocking Massachusetts waters with this "king of game fishes" does not seem so remote as it did four years ago; indeed, it now seems assured.

If, as a result of continuous effort, the day soon comes when it is practicable to catch, within our own borders, landlocked salmon, brown trout,—the famous trout of Izaak Walton,—the brilliant-sided rainbow trout, the sleek Susquehanna salmon (as the pike perch is often called), in addition to the peerless square-tail trout of our brooks, also the black bass, the keen-eyed pickerel, the white perch or the ever-present yellow perch,—humble congener of the more lordly member of the family, the pike perch,—the angler of this State will have the opportunity to enjoy the ponds and brooks which, near his home, will then contribute liberally to the gratification of his love of sport and his appetite. The day is near when this will all be possible, and even now there is a growing appreciation of the advancing value of brooks and ponds because of the increase of fish in them, and the consequent enhancement of their attractions.

Following the precedent heretofore established, an attempt will be made to show the condition of fishery, from the angler's stand-point, in various parts of the State. For the sake of convenience, the State is divided into three sections—eastern, central and western—for this purpose. The first group of extracts from news items, letters and reports, shows the noticeable features of fishing, including angling for smelt, in the eastern division.

Among the interesting communications received was one addressed to the chairman by Mr. C. A. Driscoll of Boston, who mentions the capture of landlocked salmon from a pond near the sea in Barnstable. He writes : —

About the middle of August, 1902, I was fishing at Neck Pond, so called, in the village of Osterville, town of Barnstable, and caught three landlocked salmon, which weighed approximately from three-quarters to one pound each.

He was very certain of their identity, for when this occurred he had just returned from Dan Hole Pond, N. H., where he had caught fish of this species. Besides, other fish of the same kind were taken from Neck Pond and sent to the United States Fish Commission, in Washington, he says, for identification.

The Sandwich correspondent of the Boston "Herald," in a despatch dated April 25, 1903, writes : —

Despite the extremely cold and rainy weather which has prevailed this month, the trout fishing has been better than for seven or eight years.

The Boston "Herald," of May 4, discussing the smelt and its appearance in the brooks of the eastern section of the State, says : —

Many of the brooks in the vicinity of Boston are now thoroughfares for the fish. Danvers brooks have their share, as do those of Hingham, Weymouth, Nantasket, Newburyport, etc. The Weymouth brook once had a very euphonious Indian name, but the miracle of the fish crowding its banks in the spring was so remarkable that everybody forgot to call it anything but just "Smelt Brook." At present it is the great sight of the town, and the banks are not only frequented with sightseers, but even the cats cannot resist dabbling their dainty paws into the dreaded water for an occasional catch, and ducks that live along the way are gorging themselves with the feast continually hurrying past them.

This wealth of fish life, hurrying with irrepressible ardor to the head waters of the streams, impelled by the overmastering instinct of procreation, is then of little interest to the angler, however much of future pleasure it may promise him. For

while the spawning impulse is on them, the smelt, like some other species of fish in the breeding season, refuse the daintiest lure, and “will not look at a hook,” as a fisherman expressed it.

Mr. Fred J. Brown of Woburn, replying to an inquiry about pike perch in early August, said he had “not heard from nor seen a single pike perch *out of water*. Pike perch ten or twelve inches long have been seen,” he continued, “but they do not seem to take any bait.”

Mr. P. McCarthy of Lawrence, writing under date of May 26, in explanation of a request he had made for landlocked salmon fry, made the following statement: —

My reason for asking for landlocked salmon was that I got some from Mr. Brackett some years ago, and put them in the same brook with good results; and I actually think the first salmon I landed on the Merrimack River with rod and line was one of those landlocked salmon fry that I put into Hawkes Brook at the rapids in Mitchells Falls.

The following items are extracted from the annual reports of the deputies in the eastern section of the State: —

Plymouth. — It is well known that game fish are becoming extinct in many of our ponds, . . . and it is evident something will have to be done soon in the way of stocking the ponds. Brook trout are also very scarce. — WALTER D. SHURTLEFF.

Raynham. — Fish remain about the same in ponds not stocked. — HENRY S. WILBUR.

Pembroke. — Good fishing this season; fine catch of black bass, pickerel and white perch. — OTIS FOSTER.

Hingham. — Smelts have been large; the run about same as usual. — W. I. JAMES.

Cohasset. — Fine results have come from stocking and closing [Lily] pond to winter fishing. Large catches of pickerel have been taken from the pond last season. — W. O. SOUTHER, Jr.

Quincy. — Smelts have been very plentiful this year, and some large catches have been made. — C. N. HUNT.

Fishing is good. There have been some good catches of pickerel and perch and extra good catches of smelts around Quincy and vicinity. — DAVID L. GORDON.

East Dedham. — Pickerel, trout and perch are plentiful in the ponds, but the Neponset River is a cemetery for fish. — SAMUEL HARRIS.

Needham. — I saw lots of brook trout [in a brook] of all sizes a few days ago. — A. CROWELL.

Milford. — Fishing is not extra good. There is complaint that people in early spring catch the trout put out the previous season. — W. N. PRENTISS.

East Norton. — Since Winnecunnet Pond was stocked the pickerel season has been one of the best that we have had in years. On June 6 Messrs. Sylvester and Eaton of North Attleborough caught thirty-one pickerel. Very few white perch caught [yet], but they are increasing. — E. C. PIKE.

Marlborough. — Fish are quite plentiful in the small streams. — LYMAN HAPGOOD.

Trout are doing well. — H. C. HUDSON and H. A. SNOW.

Northborough. — More trout last spring and larger in size than in the past. — ETHAN BOTHWELL.

Woburn. — The trout season brought forth some fine specimens, and also brought out the fact that this vicinity can produce as good trout as anywhere in the State. Pickerel, perch and black bass have been caught quite freely in Horn Pond, but none after November 1. No pike perch have been obtained, although they have been seen as long as ten or eleven inches. — F. J. BROWN.

Wakefield. — Fishing in our lakes holds good, notwithstanding they are fished so much by out-of-town parties. Many strings of large perch have been caught, and many pickerel weighing from one to four and one-half pounds. Black bass have been taken that weighed from one to five pounds. A bass that was badly hooked and broke away later came ashore dead; it weighed seven and one-quarter pounds. — SAMUEL PARKER.

The good results of restocking fished-out trout brooks are plainer than ever before, as fair catches of trout have been made this year in brooks which have been wholly empty. — GEORGE M. POLAND.

Reading. — There were elegant strings of trout caught this season; one trout taken from North Brook weighed a pound and six ounces, and one caught three hours later from South Brook weighed a pound.* — H. E. MCINTIRE.

Lynnfield. — Trout fishing has been very good this year. — GEORGE WILLIAMS.

North Lexington. — Fish are quite plentiful. — CHARLES E. WHEELER.

* This is interesting, since we are credibly informed that two or three years ago the Reading brooks were barren, so far as trout were concerned. They were then stocked by Mr. Arthur E. Roberts, at that time representative in the Legislature, with fish obtained from the commission.

Groveland. — The first three days' fishing in Argelia Brook * eight hundred good trout were taken, as near as I can find out. I was at the brook last Sunday, and saw plenty of fingerlings. — GARDNER WOOD.

Georgetown. — Fish are doing well. Nice strings of perch and trout were caught this summer. — H. L. BROWN.

North Andover. — Black bass, pickerel and white perch have been caught in large numbers in the great ponds. — WILLIAM J. TOOHEY.

Haverhill. — Fish are about the same as last year. — EDOUARD MAILLOUX.

Lawrence. — The brooks in Andover that were stocked with trout last year are doing well; lots of nice trout in each brook. — A. J. RAUSCH.

Gloucester. — Trout fishing at Gloucester and Rockport has been fair. — A. ROGERS.

Central Section. — The fishing at Lake Quinsigamond is thus referred to by the Worcester "Telegram," May 20, 1903: —

Some philanthropist must have restocked Lake Quinsigamond, for fish were reported as biting lively yesterday. R. W. Fiske, who was out with C. A. Lewis, Charles Steele and Denny Hagerty, says they caught fifty-three pounds of pickerel, and had rare sport. Mr. Fiske was particularly elated over landing a pound-and-a-half trout, which was the only trout taken.

The "Telegram" of April 29 made the following allusion to the capture of a landlocked salmon, which is supposed to be one of those put into Lake Quinsigamond by the commission. The despatch was dated at North Grafton, April 28, and says: —

Medoz Perron, Main Street, caught a landlocked salmon at the rear of the Washington Emery Mills this afternoon. It is the finest ever caught in this stream, weighing over six pounds. It is thought the salmon came down the stream from Lake Quinsigamond.

Concerning this, Mr. C. H. Nelson wrote: —

The published statement of weight was exaggerated, but the fish did weigh over four and one-half pounds. It was caught by Medoz Perron.

* This was a brook stocked in 1901, and the fishing therein regulated in accordance with section 5, chapter 91, Revised Laws. It was opened during the trout season of this year to the extent that fishing was permitted three days in the week.

Forest Lake. — In his weekly report for the week ending June 7 Deputy John F. Luman stated that a “handsome rainbow trout nine inches in length” had been taken in Forest Lake, Palmer. The fact that this pond had been stocked by this commission with rainbow trout fingerlings two years previously made the taking of a trout of this species during the present year convincing evidence of the survival of the fish put into the lake. This is at least encouraging, especially in view of the fact that in another year those that still exist will have reached the spawning age.

The Palmer “Journal,” Sept. 18, 1903, in discussing the local fishing, says: —

Those who enjoy the sport of fishing and have turned to Forest Lake and Round Pond for the indulgence of this proclivity have been quick to note the beneficial results which have accrued by reason of the stocking of these waters by the Fish and Game Commissioners, and the closing of them to ice fishing, as well as restricting the fishing with hook and line. As a result of such restriction the fish have had an opportunity to mature and grow fat during the past two years, and some fine catches have been made recently.

Some particularly choice specimens have been taken from Round Pond within a few days, among them being four fish caught one day which tipped the scales at ten pounds, — an average of two and one-half pounds each. From Forest Lake some big fish have also been taken, a few of them weighing five pounds and over. Previous to the closing of these waters the capture of a fish of this size was a very unusual event. . . .

Landlocked salmon do not live in all Massachusetts waters, but Forest Lake seems to be an ideal place for them, as several have been taken there this year. Although they have not attained great size, their growth in the past two years proves that they will give anglers some good sport in the near future if allowed to grow a little more. This fish is slow to show itself in Massachusetts waters, but the fact that they have been taken from Forest Lake is evidence of good sport to come, and anglers will be glad to know that salmon fishing in Forest Lake promises to be a rare sport within a very few years.

At various times in the early part of the season Deputy Shea of Ware has sent the following information about fish and fishing, which is in addition to notes in his annual report, elsewhere quoted: —

E. W. Lawton of this town [Ware] informed me this morning that there were two rainbow trout caught in the lower end of Muddy Brook yesterday; they were about seven inches long. Muddy Brook runs into Snow's Pond, and Snow's Pond is where we planted some rainbows last fall, and that is where they must have come from.

In his report for the week ending June 14, he says:—

Mr. Brannigan and Mr. Sheldon fished Muddy Brook Saturday, and got twelve trout that weighed from three-fourths to one pound each, and several smaller ones. Mr. E. M. Thayer fished the same brook Saturday forenoon, and got about twenty-five trout that would weigh about one-fourth pound each.

In looking over the baskets of Mr. Gee of North Dana and Mr. Swift of Athol, June 21, I saw some trout that they caught in Swift River with a fly, and they weighed over two pounds each. Mr. Gee told Mr. Luman and myself that the day before they caught fifteen trout, that weighed over ten pounds. Mr. H. E. Brown, the man we looked over on Silver Brook, told us he has caught six hundred trout this season.

In his report for the week ending August 30 Deputy Shea makes the following statements under the head of "Remarks:"—

While in North Dana, August 25, Mr. H. E. Brown informed us that he has caught eight hundred trout this season! . . . Mr. Charles Gee of North Dana told us that he has found trout fishing the best this year that it has been at any time during the past ten years. Mr. Gee is an expert fisherman, and does considerable fishing. Mr. E. M. Thayer of Hardwick reports the same about trout.

Mr. Edward Miller, secretary of the Northampton Rod and Gun Club, writing on May 25, stated that trout fishing had been better the first two weeks of the season than he had ever previously seen it in fifteen years. After the time mentioned it was not so easy to catch trout, for the reason that the long-continued drought dried up the trout brooks and made fishing difficult.

Following are extracts from annual reports of deputies:—

Upton.—We think fish are better since we stocked the brooks.—
P. SHAUGHNESSY.

West Upton.—There are more trout and bass this year than last.—
D. A. WARREN.

Grafton. — Trout fishing never was so good. All fishermen say there were more trout caught this year than the entire aggregate of the last four or five years. I expect next year will be still better, for the fish put in the streams * are doing well. Some of the brooks make me think of streams I have seen in the British provinces, — almost alive with trout. — GEORGE POGUE.

Fish are increasing in the streams. — G. H. BROWN.

Millbury. — Trout were plentiful this year, much better than the average. Black bass fishing was poor. — G. E. WHITEHEAD.

Spencer. — More and larger trout have been caught this season than formerly. — A. D. PUTNAM.

West Gardner. — Trout fishing has been good. Large catches have been made, frequently of good-sized fish. — F. S. CASAVANT.

Montague. — The trout fry and fingerlings seem to be doing well, and a large proportion of them are in evidence. — A. M. LYMAN.

Athol. — I think trout are diminishing here, except where brooks are stocked yearly. — A. H. JEFFS.

Webster. — Fishing was better this year. — JOSEPH P. LOVE.

Fish in lakes and streams about as usual. — R. C. HALL.

Palmer. — From every locality came the same expression: "This has been the best trout season we have ever had." Great results have been accomplished here in Palmer, where Round Pond and Forest Lake have been stocked and closed, — more and larger fish have been taken. The same results are manifest in other sections, where the work of the commission in this respect has given universal satisfaction.† — J. F. LUMAN.

Ware. — Deputy Shea, who has visited seventy-five towns between the New York line and Cape Cod, states that the past year has been a record breaker for trout fishing. He reports: —

Old fishermen from all sections report trout fishing the best last season it has been for ten years. Mr. Charles Gee of North Dana reports catching thirteen trout that weighed sixteen pounds, and the like is reported from all sections.

Western Section. — In no other section of the State, perhaps, has there been as much comment on fishing as by the press of that under consideration, and it might be feasible to

* These are streams stocked by the State.

† The notes of Mr. Luman refer generally to the whole central section of the State.

quote newspaper statements *in extenso*, if occasion demanded it. We shall, however, content ourselves with a few of the many extracts that are before us, and, as heretofore, in dealing with the fishing in other sections, use these as, in a way, introductory to the notes extracted from reports of the deputies, which cover a much broader range of territory and observation.

Among the Great Barrington news items in the Pittsfield "Eagle," June 10, 1903, was the following:—

Dr. Stockwell of New Marlborough caught a three and one-half pound trout in the Konkapot River Monday, and it is to be mounted by Henry Rudge, the taxidermist.

A correspondent of the Pittsfield "Journal" of April 18 submits certain statements which, while calling attention to large catches, justly condemn the spirit which prompts some fishermen to take out of a brook the last trout that can be induced to bite, quite regardless of anything except that it counts, and adds "one more" to the string. He says:—

A morning paper publishes the catch of two alleged sportsmen during the first two days of trout fishing this season. Two men in one day took one hundred and twenty-seven trout weighing eighteen pounds; the day previous, one of them took twelve pounds of fish. So each of these men captured sixty-three fish, weighing nine pounds.

The statement, if true, is certainly discreditable, and betrays a deplorable lack of the instincts of real sportsmen anglers. No man who slaughters fish in this wholesale fashion has any decent regard for the rest of the great army of fishermen. And it is bad enough to be guilty of such unsportsmanlike conduct, without making a boast of it in public print. Still, this publicity may be a good thing, for all men may know the sort of chaps who are depleting our brooks of trout.

Thus early in the season trout are not full of fight, and there is as much glory in pulling out speckled trout by the wholesale as there is in picking potato bugs.

The very men who did such fishing would be among the first to accuse poachers, market-fishermen, dynamiters and brook-limers of destroying all chances of even a moderate basket. But, of the two classes of fishermen, certainly the man who takes out twenty-one pounds of trout in two days is no better sportsman than the other, though he is within the letter of the law. Men who do their best to kill every fish in a stream are extremely selfish, to put it mildly, and

there is little to condone in such "sport." If a man is so selfish as to clean out a brook with hook and line as completely as though a net had been used, he ought to be labored with, to be convinced that there is a legitimate catch, within the bounds of reason.

Protection of fish and game is perfectly useless, a roaring farce, so long as such catches as those cited above are of common occurrence.

The Springfield "Republican" of April 17 contained despatches from various points relating to trout fishing, which indicated that the angling in the early part of the season was generally good, and the catches as large as prudence and care for the future of the brooks would suggest they ought to be. Its Northampton correspondent, referring to records made on a cold day, when trout are popularly supposed not to be inclined to take a hook, makes mention of the following:—

Some of the records are the following: C. H. Sawyer and W. A. Sheldon, forty-four, weight seven pounds; Matthew Grogan and Patrick Ahearn, twenty-eight, weight five pounds; John Fenton, sixteen; Eugene Dickinson, thirty-five, weight five pounds; Walter Tomer, twenty-six; Louis Gaylor and W. J. Collins, sixty-four, weight fourteen pounds; J. T. Dewey and Joseph Torr, ninety; Charles Daniels, twenty-five, weight five pounds.

In the Great Barrington items of the same paper was the following:—

John Race and Mr. Taylor caught fifty-eight trout Wednesday, Henry Fassett and Edward Cross fifty-eight, Oliver Rivers and O. Gould twenty-six, and John B. Hull twenty-one, some of the fish tipping the scales at a pound.

There was also the following reference to fishing near Springfield:—

Five West Springfield sportsmen had excellent luck fishing for trout in Bear Hole Brook yesterday. They set out about 5 in the morning and returned at 4 in the afternoon. They brought back in all sixty-two fine fish. One of the party caught a trout weighing over a pound. *The fish are plentiful, and of fine quality.*

The North Adams "Transcript" of April 22 published a Williamstown despatch, as follows:—

H. H. Heap caught a trout Tuesday afternoon from Green River that doubtless holds the record of late years. The fish was exactly sixteen and one-half inches from the end of his head to the tip of his tail.

The Pittsfield "Eagle" of April 15, in noting the "many good catches," says:—

One of the first to return from the brooks was J. Ivan Shepardson. His basket and coat pockets revealed seventeen and one-half pounds of the finest trout ever taken from a brook. William Talcott of Lanesborough secured fifteen, Dr. Downing and George Roberts ten pounds each. Frank P. Newton also made a fine catch of forty-five.

The Pittsfield "Evening Journal" of May 6 notes:—

Lieut. W. K. Henry went out Monday morning early for a few large trout which had escaped him last season. He returned at noon with a score of handsome fish, all weighing from a pound to a half pound.

The same paper on May 20 says:—

E. W. Malloy claims to have caught sixty-seven trout in Berkshire trout streams in two days. One of his fish exhibited in the window of the Central market to-day weighed over two pounds.

The Pittsfield "Sun" of April 30 has the following records of large catches of brook trout at Great Barrington,— noteworthy more on account of size than numbers:—

William P. Taylor caught fourteen trout Tuesday that weighed thirteen and one-half pounds; Wallace Jones caught twelve trout last Thursday, weight ten pounds, eleven ounces. C. H. Sage and C. M. Gibbs caught twenty-five trout weighing seventeen and one-half pounds. This seems to disprove the statement that there are no trout in Berkshire over six inches in length. On Monday Sage and Gibbs caught twenty trout. In the lot were some of the finest ever seen hereabouts.

The conditions at the other end of Berkshire were no less favorable, as is shown by the following extracts:—

The North Adams "Evening Herald," April 20, says:—

Fred Crawford, a short distance from Williamstown, pulled out a trout which weighs exactly two and one-quarter pounds. The fish is

sixteen inches long, and a beauty in every particular. Mr. Crawford was so well pleased with his catch that he started at once for home, not caring to bother with the little fellows after that.

The Adams "Transcript" of May 1 notes:—

Fred Crawford caught a second two-pound trout in Green River, at Williamstown, last Saturday, seventeen inches in length and very similar to the first. This is the best local record so far as heard from.

The foregoing are only a few of the press items available which show an unusual abundance of trout in the western section of the State, and those of a size comparable with the trout taken from brooks anywhere. The notes from deputies which follow will further emphasize the conditions in 1903 both as regards brook and pond fishing:—

Berkshire County.—The trout season in the western section of the State was the best it has been in a number of years, larger trout and bigger strings were taken. Bass fishing was also good. — A. M. NICHOLS.

Florida.—Fishing was better this season than for many years. The season closed with brooks well stocked. — L. E. RUBERG.

Adams.—The trout season was the best in many years. Trout ran large. Even in Pittsfield, where, according to some, trout are only four or five inches long, some were caught that weighed from one pound to two and one-half pounds each. We can now see the benefit of stocking the brooks, and the better protection of fish. This is the first year I have not found some of the springs limed. I never saw so many trout in the springs as last Sunday [November 8]. — FRANCIS O'NEILL.

Buckland.—There were more and larger trout this year than there have been for several years. — M. J. CRANSON.

I found the trout fishing excellent, large ones much more plentiful than in former years. — E. C. HALL.

Pittsfield.—Small amount of trout caught this season, on account of low water, but there are plenty of trout spawning at present. Very few black bass caught from Onota Lake; there was better fishing in Pontoosuc Lake. More pickerel taken from Onota Lake this season than in any two years before. — W. R. STEARNS.

New Lenox.—Fish are getting more plentiful. — H. H. DEWEY.

Lee.—Greenwater Lake, in Becket, has been filled [with fish] the past season. — C. H. PEASE.

Becket.—Trout have been plenty and of larger size than last year; there is a good stock left over for another year. — W. J. CROSS.

FISHERIES.

Notable Features of the Year.—Remarkable as 1902 was for events in the sea fisheries that could be considered extraordinary, the current year is no less so, and in some respects is still more noteworthy, although the chief features differ materially from what has been previously recorded by us. While some of these happenings indicate a gratifying prosperity and progress, others, unfortunately, demonstrate too plainly that influences are at work which, if they cannot be checked or controlled, are morally sure to injure the fisheries and to retard their development more or less.

For many years our ocean fisheries have been confronted with conditions that gradually have caused their abandonment in most localities outside of the larger ports. It will certainly be unfortunate if the industry in these ports, which are the last strongholds of deep sea fisheries, should also be subjected to influences from those engaged in them that may work great harm. Reference is made to the mutinous spirit which appears to have prevailed this year to an unparalleled extent among the fishing crews, if the published accounts furnish any basis for correct conclusions. Not only have voyages been broken up, according to these statements, and vessels been compelled to return home without fares of fish, but the lives of masters have been imperilled, the safety of property jeopardized, and peace-loving men, who constituted the bulk of the crews, have been prevented by bullies or desperadoes from pursuing the cruises upon which they sailed, while they have been subjected to threats or possible personal violence that cannot frequently be repeated in any sea industry without destroying it. One master of a fishing vessel, who shot one of his crew who was alleged to be in open mutiny, is incarcerated in prison in a foreign country ; while members of a crew who caused much disturbance on another schooner, causing her return home, as was averred, were, after trial, discharged from custody. The effect of all this can scarcely fail to be seriously harmful unless steps are immediately taken to prevent a recurrence of these distressing events ; for it is evident to all familiar with the sea, and especially to those having knowledge of our deep sea fisheries, that

the result of the action of the courts will be to encourage insubordination in our fishing fleet, and to make the masters helpless, so far as legal right is concerned, to maintain discipline and to suppress mutiny. If the decision of the courts indicates that it is not illegal for members of a fishing vessel's crew—more or less under the influence of intoxicants, and with their brutal passions inflamed—to appropriate the boats or other property belonging to a schooner, contrary to the orders of the master; to threaten personal harm to the master or their shipmates; to break or destroy property of the vessel they are on; or to go on shore in a foreign port contrary to orders, then no time should be lost in securing the enactment of laws that will apply to such cases, and that may make possible the prosecution of a business in which, like all business of the sea, subordination is the key-note of success, for without it nothing need be expected but disaster.

Capt. William Thomas, master of the fishing schooner "Elmer Gray," has been credited with giving expression to statements that seem to us so eminently correct that we are glad to quote them in full, since it appears to us this matter is one the importance of which cannot be overestimated; and for that reason the conservative views of wise and experienced men should receive the consideration they are entitled to. He says:—

Sailing masters are not afforded sufficient protection. Hardly a crew but what includes a foreign element, and even if there are several good men aboard, they will invariably be enticed into wrong-doing. Captain Willard is now behind the bars because he defended his life. The decision has served to increase the hostility of brow-beating sailors. Each vessel ships about eighteen men, and when trouble arises it is the captain against his crew. The situation then resolves itself into one of self-defence or a jump over the side. According to Captain Willard's treatment, all masters who protect themselves must reckon on long imprisonment.

The enmity of the sailors has its basis solely in lack of bait. It is an unfortunate predicament, but no one is to blame. For some unknown reason the squid have been scared away, and without them fishing is impossible.

I fear that blood will be spilled before our Gloucester vessels succeed in returning. The foreign sailors are in desperate mood, and if

an outbreak occurs on the high seas, it will embrace all American vessels within bounds. Captain Arsenault's encounter with his crew will, I expect, be repeated on other vessels.*

It is evident that prompt measures should be taken to change the system of officering fishing vessels from those ports where it is customary now to have only one officer,—the master. The system was doubtless adequate a century ago or thereabouts, when crews of the fishing craft then in vogue rarely numbered more than seven or eight men in all; and these were usually neighbors, friends or relatives of the master, who could not possibly anticipate any difficulty in maintaining his control. Indeed, the skipper was sometimes reluctant to assume the command to which his shipmates had elected him.† All worked together then for the common good.

But a vast change has taken place since the days of chebacco boats and pinkies. The vessels employed to-day are immensely larger; they generally carry crews ranging from fourteen to more than twenty men, and these men are drawn from many sources. Often they are foreigners,—at least many are foreign born,—of many nationalities; they are usually free from the personal ties of ownership, kinship and friendship that bound men in former times to their vessel and their skipper; and some of them have no concern whatever for the property rights of owners, nor regard for the authority of the commander unless he chances to be physically qualified to enforce the respect that is due him. Even then he cannot look after the welfare of his charge when he is on shore, as he often has to be on business incident to a voyage. At such times a vessel must of necessity be left to the mercy of viciously inclined persons in a crew; for, inasmuch as there is no officer on board, there is no one with legal authority to prevent whatever excesses may occur. Under these circumstances, it is remarkable that the conditions met with this year have not sooner appeared. There is no question in the writer's mind—and he speaks from an

* The Boston "Post," Sept. 5, 1903.

† The writer was told by the late Andrew W. Dodd of Gloucester that he actually shed tears, when, just before he was out of his teens, it was decided that he should take command. The responsibility overawed him. But his success was great.

experience of thirty years in the Atlantic deep sea fisheries — that there have been many occasions in recent years when they were dangerously near.

Foreseeing the probability of such occurrences, and realizing their detriment to the fishery, he ventured to publish the following recommendations fully twenty years ago; and these are now repeated with the emphasis justified by the regretful incidents of the present year: —

(a) Since the needs of the fishing vessels are at the present day not very different from those employed in the whaling and merchant marine, it seems evident that there should be more than one officer. There should be a mate, or first officer, who should share the responsibilities of the captain. He should have authority in the absence of the captain, and in case of accident to the latter should at once take charge of the vessel. This man should, of course, be subject to examination, like the captain, or at any rate should give evidence to the proper persons of his ability to perform the duties of his office. The creation of a grade of subordinate officers among the fishermen would undoubtedly have a good effect upon the whole body of men engaged in the pursuit. The number of responsible positions would be doubled, and the responsibility placed upon these men would render them more sedate and reliable. They would be recognized as in the line of promotion, and their efforts to improve themselves would be greatly stimulated. The advantage to the fishery capitalists also would be very great, since they would be able to supply vacancies in the list of skippers from men who had been systematically trained for the position, instead of being obliged to select untried men at random from among the crews. At present the only means by which the owner can select a skipper for one of his vessels is upon the recommendation of some other skipper with whom he has sailed, and every one knows how little value such recommendations ordinarily possess.

(b) The enactment or the confirmation of laws by which the relations between the crew, the skipper and the owners shall be clearly defined. It is the common belief that the same laws apply to the fishing vessels that are in force with respect to merchant vessels. Even if this be the case, the question of law is but little considered by the fishermen in the discipline on board of a fishing vessel. The officers should be supported in the necessary measures which they may take to quell insubordination or mutiny and to prevent disorderly conduct, the same rights being recognized as in the case of merchant vessels. The crews should be obliged to sign shipping papers in regular form, and these papers should be regarded as legal contracts,

and means for their enforcement should be provided ; this, too, without the necessity of protracted and expensive law suits. American consuls in foreign ports should be instructed to aid the masters of vessels in controlling disorderly men. Such a provision as the last one would have an important effect in controlling the acts of crews in provincial ports. It is now possible for two or three of the crew, by drunkenness and disorder, to neutralize the well-meant efforts of all their associates, and prevent the success of the voyage.

(c) The investment of the officers of the vessel with a greater amount of dignity. It is, of course, impossible on board a fishing vessel to maintain the same kind of exclusiveness which prevails on a merchant vessel or a whaler. The number of officers is less, and the nature of the employment prevents all ceremony. At the same time, it is within the power of the officers, by their personal bearing, to prevent familiarities on the part of the crew, and thereby greatly to increase their own influence.*

It is probable there will be those whose conservatism will cause them to strenuously object to any such changes. Innovations are always opposed, and the idea of changing the long-established customs of the fisheries will be repugnant to many ; to some because of anticipated additional remuneration to those who assume official responsibilities, even if, in the end, owners are benefited many times the cost ; and to others, and especially those who are liable to be unruly, because they feel there will be less chance for them to do as they wish. But these objections should have no weight ; they are undeserving of any consideration, if the continuance of ocean fishery on a satisfactory basis is a matter of much moment. The important point is to prevent an industry — in which most of the men are peace-loving and respectable — from being injured or destroyed by a few drunken insubordinates, who may have brute strength enough to terrorize their shipmates, and practically take unlawful command of the vessel.

A remarkable event of this year was the action of the federal government in sending the United States revenue marine steamer " Seminole," in midwinter, to the north-west coast of Newfoundland, to attempt the release from the ice-beleaguered

* "The Fishery Industries of the United States," section 4, "The Fishermen of the United States," pp. 99, 100, by George B. Goode and Joseph W. Collins.

harbors of that region — notably the Bay of Islands — of the fleet of Massachusetts fishing vessels (chiefly from Gloucester) which had suddenly been overtaken by extremely cold weather while seeking cargoes of herring somewhat later in the season than it is safe to remain in that region. The attempt was a bold one, and one that deserved success; one also that evinced the praiseworthy disposition of the government to brave great dangers to aid the fisheries. It was, however, doomed to failure, for the grip of the ice king on that semi-arctic coast was so strong that it was found impossible for the rescuing ship to reach the place where the fishing vessels were held helpless, and where they were compelled to remain until released by returning spring. Meantime, the “Seminole” escaped with difficulty from the dangers that beset her, and returned to the United States battered and worn with her brave struggles, and with only the glory of a determined effort to overcome obstacles that proved insurmountable.

The defeat of the so-called Hay-Bond treaty, which was vigorously opposed by the fishing interests of this State, was an event of large consequence to our sea fisheries, and undoubtedly is scarcely second to any other of the period covered by this report. It is far within probabilities, however, that this will not end the efforts to secure free entry into our markets for provincial fishery products. The recent conclusion of the Alaska boundary dispute seems to make possible early attempts to open negotiations for reciprocity, in which provincial fishery products will doubtless be a factor of importance. However this may be, the hope is cherished that the present era of good feeling and mutual benefit resulting from the *modus vivendi* in force since 1888 will not be disturbed as a preliminary to any other anticipated settlement. Under this our fishermen, by the payment of \$1.50 per ton of their vessel as a license fee, can buy supplies, bait, ice, and reship cargoes, also ship men, etc.

Nothing associated with the sea fisheries of this Commonwealth is more out of the ordinary than the transportation of cargoes of frozen squid from Cape Cod to the island of St. Pierre, off the Newfoundland coast, where they were quickly disposed of to be used as bait by French fishermen on the

off-shore oceanic banks that are resorted to for fares of cod in spring and summer. In view of the importance of the bait question and the part it has played in international relations, as well as the assumption that New England is almost wholly dependent for bait on supplies secured in foreign ports, this episode of supplying the fishing fleets of a friendly power with the surplus bait taken in Massachusetts waters is instructive and impressive; especially so when consideration is given to the fact that bait was supplied to a fleet at a Newfoundland island port. Now that large refrigerating plants are established along our coast, and it is easily possible to preserve fresh and savory large quantities of bait species, such as squid, herring, etc., for an indefinite time, the fishery for these assumes proportions of national importance, besides supplying material for international commerce. It also forcibly illustrates the resources of modern methods, whereby the wealth of the seas, which may abound at certain seasons, is made available to our citizens throughout the year.

The supplying of our cod fishing fleet with bait carried from home to the banks, thus obviating the loss of time in seeking bait in foreign ports, may seem a rather startling proposition; but stranger things have happened, and it may be one of the changes which are liable to occur in the effort to pursue the bank fisheries in the most profitable way.

A noteworthy departure from well-worn custom has been the utilization of a naphtha engine on a mackerel seine boat. Captain Jacobs of the fishing steamer "Alice M. Jacobs" was responsible for this innovation, as he has been heretofore for the introduction of many other attempts to improve the fisheries. We understand that the object was to have the pursing of the seine done by motor power. Thus greater speed in capturing a school of fish is assured, for the circling purse net can be gathered in by a five-horse-power engine much quicker than by hand.

For many years, if not always, our fishermen have experienced much loss and annoyance from dogfish, which during the summer months swarm on the fishing grounds in enormous numbers. Insensible to fear, ferocious as wolves, armed with sharp spines and lancet-like teeth that cut clean when they bite,

they destroy much fishing gear, and allow no other fish to bite, thus making fishing unprofitable where they occur in large numbers. Having no market value, they are unprofitable to catch, and have always been considered a pest, notwithstanding their livers yield a considerable quantity of an inferior oil.

We have tried to discover some method by which the dogfish could be utilized for commercial purposes, so that its abundance at certain seasons may be turned to good account, and the ocean be relieved somewhat of an oversupply — notably large this year — of an extremely voracious species of the shark family that preys upon other fish which are valuable to commerce. We have talked with several persons who are in a position to conduct experiments as to the feasibility of making oil and fertilizer from dogfish, and thereby giving them a market value. The difficulties to overcome are much greater than one unfamiliar with the species might think, but it is probable they can be surmounted. We understand that experiments are now being conducted by competent persons, to determine if it is possible to utilize the dogfish profitably. If this year's experiments are successful in this particular, the result will be most noteworthy. The important thing is to find some cheap, effective method to completely separate from the flesh a small amount of oil that is found in it, the presence of which makes it impracticable to satisfactorily prepare the material for a fertilizer. Simple as this may appear to be, all efforts to accomplish it have so far proved failures, so far as we are informed; hence hundreds or thousands of tons of dogfish which might annually become available are not utilized or even saved, — there is no market for them. While we are not in a position to speak positively of what is going to be done, we have reason to believe that the year 1904 will see a well-thought-out effort made in this State to utilize the dogfish and to make it an object of commerce.

The introduction of the otter trawl at Cape Cod for flounder fishing is an event that may have a large influence on our sea fisheries. The commission has been glad to exercise its good offices, so far as giving information, etc., is concerned, to bring about the introduction of this form of apparatus, which is

believed to be far superior in effectiveness to the beam trawl heretofore in use.

The otter trawl has entirely superseded the beam trawl on the fishing steamers of Great Britain, and in other countries of western Europe it is used to a greater or less extent by sailing craft as well as by steamers. Its superior efficiency has become widely recognized wherever net trawling is practised. In Southern Europe, however, the *parenzella*, a modification of the otter trawl, requiring two boats to tow it, is extensively employed.

If the otter trawl proves to be as profitable and popular here as in Europe, there is reason to anticipate that it may ultimately be widely utilized in our fisheries, especially if the demand for flatfish develops, as it may in time, and it is found desirable to engage in a fishery in which the bait question is not a factor.

The year is remarkable for some earnings of vessels and crews that would be noteworthy under the most favorable circumstances; but they are deserving of larger attention now because these records have been made despite generally unfavorable meteorological conditions during some of the summer months, and a scarcity of fish of some species that gave rise to many complaints. In view of the extraordinary records made in some branches of fishery in recent years it is little short of marvellous that they should have been equalled or excelled in a season more or less noted for unfavorable conditions.

As early as 1651 the General Court of Massachusetts "ordered that in every town within its jurisdiction officers should be appointed whose duty it was to see that the barrels of fish be properly packed," and from that time forth it is probable fish were officially inspected in this Commonwealth. It is certain that a record of the inspection of mackerel since 1804, including that year, is available. But this year not a fish has been officially inspected in Massachusetts, so far as we can learn, and for the first time in a century, and possibly two and one-half centuries, the purchaser of fish, which are the result of fisheries of this Commonwealth, is utterly dependent upon the honor and integrity of the producer or dealer for a guarantee of their quality and proper care, unless special

request for inspection is made. Apparently the present arrangement is satisfactory, for we learn that no one has indicated a desire to have fish officially inspected this year; but the abandonment of a guarantee that has been thought necessary and desirable since the early settlement of New England is a fact worthy of record.

Shore Weir and Net Fisheries. — Another season has passed, and still the mackerel has unaccountably absented itself from the in-shore waters of this State, and particularly has it kept away from Cape Cod Bay, where it has generally been found in greater or less abundance; if it occurred there at no other time, it usually appeared when migrating south in late autumn, at which time the schools of fish, often of large size, swept into the bay formed by the long, hook-shaped sandy arm of Cape Cod that reaches out into the sea. Why it has kept away or when it will return no one knows; the wisest can only conjecture. The fishermen are uncertain, or fear it will not soon return. Capt. Atkins Hughes of North Truro, one of the most observant of them, writing on October 12, said: "You will notice that mackerel are a fish of the past with us, and that their place has been partially taken by weakfish, of which we have caught the past season about 140 tons, valued at \$4,500."

It is the belief of many fishermen, or possibly of all of them, that the remarkable abundance of the weakfish or squeteague in Cape Cod Bay in recent years is the cause of the mackerel keeping away, for it is thought the instinct of the latter warns it from entering waters filled with an enemy so predaceous and destructive as the weakfish is. However that may be, the absence of the mackerel is enough to give color to the belief.

An examination of the returns of this year shows that there has been the usual fluctuation in the catch of fish, this being generally due to the greater or less abundance of some species, but in some cases it is ascribable to changes in the amount of gear in operation. Thus there was a decrease of 734 seines, gill nets, etc., the apparatus by which alewives are principally taken; and the catch of the latter species fell off more than one-half, — from 1,546,313 pounds in 1902 to 771,362 pounds in 1903. On the other hand, there has been a decrease, as compared with the catch of 1902, of 58,266 pounds

of bluefish, 134,578 pounds of mackerel, 1,219,501 pounds of sea herring, 1,096,688 pounds of squid and 3,879 pounds of tautog, solely because of a less abundance of these species.

At the same time there has been an increase in the catch of 301,575 pounds of flounders, 406,255 pounds of menhaden (these are usually sold for bait or food), 130,858 pounds of pollock, 265,409 pounds of scup, 30,860 pounds of sea bass, 14,290 pounds of shad, 117,871 pounds of squeteague, 7,807 pounds of striped bass, 2,281,614 pounds of edible or bait fish not otherwise specified and 13,757 pounds of refuse fish. It will thus be seen that the actual net increase in the catch of this year, as compared with 1902, was 282,386 pounds, but 13,757 pounds of these are classed as "refuse fish," and are supposed to have no value, therefore the increase of salable fish is only 268,629 pounds. These figures are, of course, exclusive of lobsters, and represent the catch of the weirs, seines, gill nets, etc. It will be seen that there is a very large increase of those species classified as "edible or bait," the catch this year being 3,725,300 pounds, while in 1902 it was 1,443,686 pounds. The whiting, or silver hake (*Merlucius bilinearis*), is included in this class; and we are informed that 7,000 barrels of this species, which formerly was a refuse fish, have been marketed, generally as a salted product, but it is reported that some were put in cold storage.

Because we have done what we could, verbally and otherwise, to promote the utilization of this species, the commission has much satisfaction in what has been accomplished in the profitable use of a fish which has been so abundant at times that it proved an actual nuisance to the fishermen. The Gloucester "Times" of Nov. 23, 1903, says of them:—

Until a couple of years ago they were considered a nuisance and a plague by the weirmen of the Cape, for they were not only unsalable, they not only came annually to the waters at the hook end of the Cape, but they came in legions, fairly clogging the weirs by dint of numbers, to the exclusion of desirable species, and making weiring profitless during the period of their stay. . . . Masses of dead and dying whittings, frequently as much as two hundred barrels in a lot, would then go floating away to leeward from the weir to furnish food for gull, crab or other hungry sea denizen, or drift upon adjacent

beaches to wash to pieces in the surf. A few barrels were iced and sent to market, but no business was done with them to amount to anything until two years ago.

Horse mackerel, which also come into this class, were much more plentiful than for two or three years, and these added to the increase of "edible or bait" fish taken.

In writing of the weirs at North Truro Capt. Atkins Hughes remarks: —

Whiting and horse mackerel, which a few years ago were not yielding us much money, this year we have sold, of whiting, 215 tons, value about \$1,900; horse mackerel, 65 tons, value about \$2,000. Horse mackerel started in at a very good price, but they became so plentiful that they would not net more than 50 cents per 100 pounds. One day our boats brought on shore over 1,300 small fish of this species.

In the spring months our boats did well on herring sold for bait and on ground fish [chiefly pollock], and the [weir] crews made the most money up to the first of June they have ever made. We sold about 370 tons of bait, and probably we did not take more than one-third of what was caught in this vicinity.

The Boston boats [market fishing schooners] could not have fished last spring without [the bait obtained from] these traps, as I think they were getting about all of their fresh bait from them.

The fall fishing of the weirs appears not to have been good. When Captain Hughes wrote on October 12 he stated: —

At present we are not getting any fish; all of our boats the past two weeks have not stocked \$100.

The small tunnies, which some designate as albacore, are probably the young of the horse mackerel (*Orcynus thynnus*), which are often called by this name. They were taken in such large numbers that the attention of the press was attracted to the captures. The Boston "Herald" of Aug. 16, 1903, remarked: —

Every day during the past week numbers of these ravenous fish have been shipped in ice to the city markets, or gone into the zero-temperated freezing rooms of the three cold-storage concerns at the tip of the Cape to await a period of fish scarcity and a rise in price.

Says the Cape Ann "News" of Sept. 16, 1903:—

A catch of over 1,000 albigores, the largest in ten years, according to the recollection of the T wharf fishermen, is one of the interesting incidents in fishing circles this week.

Some of the horse mackerel were large. One that was taken in a fish trap off Magnolia was alleged to be more than 10 feet long, and to weigh 1,180 pounds. This is the maximum size for this species. One that was reported to weigh 1,000 pounds, and to have a length of 9 feet, was taken at Provincetown, after it had pulled one man overboard and came near dragging two others out of the boat.

It is a matter of scientific interest that a mackerel (*Scomber scombrus*) taken in a Cape Cod weir, according to the Gloucester "Times" of Aug. 2, 1903, "weighed 5 pounds and 10 ounces." It was a little less than 2 feet long.

It appears that neither weirs nor floating fish traps can be successfully operated on the west side of Barnstable Bay. The writer was told by Mr. Eugene W. Haynes, one of the selectmen of Sandwich, who is a fisherman, and uses both lobster pots and nets, that it is not practicable to use a floating fish trap at Sandwich or anywhere along that shore, owing to the strong tide. He said he had made the experiment thoroughly, and had failed. The sweep of the tide as it set into the bay along the Sandwich shore caused the floats to sink so that anything caught in the trap could pass over its upper edge, and on some occasions the nets were tangled up and torn.

On May 18 he stated that he had caught some large mackerel in gill nets during the spring, but had been compelled to take up his nets and bring them on shore because of the abundance of dogfish, which had been so plentiful that they had proved a nuisance to the fishermen.

The increase in the abundance of the striped bass is a matter of some interest, for its capture by weirs or pounds has been believed destructive, by some. It also appears to have been caught to some extent for commercial purposes by other forms of apparatus in numbers that would indicate an unusual abundance of the species.

According to the Boston "Herald" of July 5, 1903:—

On July 3 the sloop "Nancy" made a catch of 156 large striped bass off Provincetown, which were estimated to weigh a total of more than 1,200 pounds.

The increase of the catch of scup, from 176,143 pounds in 1902 to 441,552 pounds in 1903, indicates that this species was in much greater abundance on our coast during the fishing season of this year than during the previous summer. This fluctuation in the abundance of the migratory species of fishes appears to be a marked characteristic, the reason for which is yet unknown by man. It has been notable in the case of the scup, which had been so long absent from the New England coast in the eighteenth century that when a specimen was caught at Newport about 1794 the oldest fishermen failed to recognize it.

The bluefish is equally uncertain, and in some respects it is a puzzle to those most familiar with its habits. As a rule, it has been less numerous on the coast of Massachusetts this year than it was last season, although it was exceptionally abundant about Nantucket. The strange thing about it is that it was almost entirely absent from Buzzards Bay, where it has special protection, and its occurrence and movements were as unaccountable and erratic as they usually are.

Stillman C. Cash of Nantucket, writing October 2, says that four fishermen, including himself, caught 1,781 bluefish on hand lines between June 14 and September 29. Another boat caught 385 "blues," making a total of 2,166. He says, "This is more fish than have been caught by the same number of men in twenty years."

The press was full of accounts of big catches at Nantucket, which substantiated the statements of Mr. Cash, and some of which were much more remarkable. Thus a despatch from Nantucket of July 28, that was published in the Boston "Herald" the following day, represented that four fishermen had broken "all previous records for bluefishing" in that locality, by catching on that date 412 bluefish in four hours; the total weight of the lot was 3,914 pounds. At the same time the steamer "Petrel" took 329 bluefish, the weight of which ranged from $7\frac{1}{2}$ to $16\frac{3}{4}$ pounds each. Again, on August

3, the "Petrel" caught 446 bluefish. Her fish were taken in a seine several miles from the shore, but catboats fishing in shore with hand lines did well at the same time.

Statements like these might be multiplied, for, from the time when the bluefish struck on early in July, and when it was said "The waters off Siasconset are fairly alive with them a half mile from shore," until the close of the season, they appear to have been present in large numbers.

On September 14 it was reported that four fishermen took into Nantucket 356 bluefish, which weighed a total of 4,270 pounds, with a net value estimated at \$400. These fish were caught that day off the southern side of the island.

Deputy Otis Thayer of Quincy, who has been in command of the launch "Scoter," cruising along the coast and more particularly working in lower Boston harbor and vicinity, reports that bluefish made their appearance in considerable numbers in Quincy Bay during the summer. He says that he has not seen any bluefish there for a number of years until this year. It is possible that the bluefish have followed menhaden into Quincy Bay, since the latter have been abundant there this summer for the first time in several years. Mr. Thayer says that he has not seen menhaden in Quincy Bay since 1895 until this year.

The shore flounder fishery from Provincetown, Wellfleet and possibly other coast towns has assumed considerable proportions, as will be noted in the chapter on sea fisheries, and has grown from an industry in which only boat fishermen engaged to one employing a number of decked vessels of considerable size, in addition to boats, launches or other unregistered craft. This fishery has been prosecuted with the beam trawl, which has been found more effective than any other form of apparatus that has been employed at Cape Cod. It is, however, inferior to the otter trawl.

There does not yet appear to be any marked disposition to introduce naphtha engines into the boats used for flounder trawling, but, as the power-driven boat is becoming so common, this may soon appear.

No special change in the shore cod fisheries has been brought to our attention, so far as boats or apparatus are concerned.

There is still a tendency to utilize the naphtha dory where it has not already been adopted, and the boat builders have turned out many of these.

We learn that the Italian fishermen have added naphtha dories to their fleet; but these are said to be employed in the herring fishery, and they have not as yet engaged in the flounder industry. The flounder fishermen still use the old sail dories, which every day gather about T wharf, or can be seen running up or down Boston harbor, with their high-clewed leg-o'-mutton mainsails that have something of a foreign look, especially if they are colored brown or red.

Clams. — On several occasions we have invited attention in our reports to the desirability of cultivating and protecting the common clam (*Mya arenaria*), but for a year or two have made no allusion to this species or to the subject of its cultivation and protection, because of the apparent hopelessness of securing legislation which will admit of a betterment of the clam industry, either by private ownership of flats, the leasing of flats by the towns, or the cultivation of clam-producing areas by the State. Meanwhile, evidences are accumulating of the deterioration of our clam industry, both as regards the productiveness of the clam flats or as to the size of the clams marketed. In many cases the clams, so far as size is concerned, are unfit for sale or consumption. But, aside from the results of the scientific cultivation of the clam in other States, there are occasional occurrences which clearly indicate the influence of incidental protection on the growth of clams, — accidental straws which go to show what might be accomplished if legislation should be guided in this particular by advanced ideas for the improvement of our clam industry. For instance, Deputy Thayer reports on a case which has come under his observation as the result of building at Houghs Neck a boat float, which is erected every spring for the accommodation of small yachts and boats. This float is of considerable area, and, being securely anchored, rests in a definite place from spring until fall, thus preventing the digging of clams under it during the months when it is in use. Thus the clams under it, which cannot be disturbed during the summer, are much larger in size in the fall than those in surrounding areas of flats. Mr. Thayer says: —

Jason Harvey of Houghs Neck builds a float some 200 feet long, which he puts out during the summer season at low water. This float lies on the flats, and clams are dug on the flats about it. This fall, when the float was taken up, John Nelson in a very short time dug a bushel of clams that would average three inches in length, where the float had laid on the flats, and where no digging of clams could be carried on until it was taken up.

Lobster Culture and Lobster Fishing.— We present herewith the reports of the superintendents of the fish-hatching stations of the United States Bureau of Fisheries at Gloucester and Woods Hole. These give detailed statements of the artificial propagation and distribution of the lobster by the federal government on the coast of this State.

GLoucester, Mass., Sept. 11, 1903.

Capt. J. W. COLLINS, *Chairman, Board of Commissioners on Fisheries and Game, Boston, Mass.*

DEAR SIR:— I submit herewith a brief report of the propagation of lobsters at Gloucester, Mass., station during the current year.

The latter part of March arrangements were made to collect egg lobsters from the fishermen from Cape Ann to Cohasset, Mass.; but active work did not begin till late in April, owing to the occurrence of a heavy storm early in the month, which destroyed the greater portion of the lobster pots, and it was several weeks before the fishermen were equipped for fishing again. A similar storm in June also proved very disastrous to the fishermen. Happening during the collecting season, these storms seriously affected the receipts from the fishermen.

The collections within this State aggregated 1,062 egg lobsters, which yielded 18,301,000 eggs. From these were hatched 16,946,000 fry, which were planted at various points along the shore from Essex, Mass., to Salem, Mass. There were also planted in these waters 4,624,000 fry from eggs taken outside the State.

As in past seasons, collections were also made along the coasts of New Hampshire and Maine, the total collections from these amounting to 45,123,000 eggs.

Very respectfully,

C. G. CORLISS, *Superintendent.*

WOODS HOLE, Mass., Oct. 16, 1903.

Capt. J. W. COLLINS, *Chairman, Board of Commissioners on Fisheries and Game, Boston, Mass.*

SIR:— In accordance with the usual custom, I beg to submit the following brief report of the work done in propagating lobsters at this station during the past year.

The work has been practically on the same line as in the past few years, and the territory covered has been the same as last year, with the addition of Sandwich. As only four or five men are engaged there in lobstering, the receipts in eggs were not large, about 700,000, but were nearly 15 per cent. of the total number collected from the waters of the State.

None of the different fishing centres yielded the usual number of eggs, with the exception of Scituate. The receipts from there increased over 100 per cent. over last year. Reports from this point are that lobster fishing the past season has been better than for several years.

In all, 261 egg-bearing lobsters were received from Massachusetts waters. These yielded 4,682,000 eggs, — an increase of about 7½ per cent. over last year. There were 4,181,000 fry hatched from these eggs and planted in the waters of the State.

In addition to the eggs received from the waters of this State, collections were made from Connecticut waters, which made the total number of eggs received at the station 11,099,000.

Very respectfully,

E. F. LOCKE, *Superintendent.*

The foregoing official reports show that, as compared with last year, there was a decrease in the number of egg-bearing lobsters collected of nearly 44 per cent., notwithstanding Mr. Locke reports that Sandwich has been added to the territory on which the collectors operated, and the section about Scituate yielded a much larger number of gravid lobsters than ever before. The output of fry fell off upward of 33 per cent., as compared with 1902.

The relative results of the work done in the coast waters of Massachusetts alone are shown for four consecutive years in the following table: —

Table showing Comparative Statistics of Lobster Culture by the United States Fish Commission at the Massachusetts Coast Stations in 1900-03.

	1900.	1901.	1902.	1903.
Number of egg lobsters,	2,828	2,045	2,361	1,323
Eggs obtained, . . .	40,231,000	26,679,000	33,241,000	22,983,000
Fry hatched, . . .	36,449,000	24,140,000	30,352,000	21,127,000

This tabulated statement speaks for itself, and seems to render unnecessary any extended discussion. Throwing aside the intervening years, and especially 1902, when favorable conditions caused a temporary increase in the collections for breeding purposes, we find a falling off since 1900 of more than 53 per cent. in the number of egg-bearing lobsters it has been possible to collect, even with the exploitation of new regions, and a decrease of nearly 43 per cent. in the fry liberated.

If these figures have the significance that seems to belong to them, they show unmistakably that the possibilities of fish culture, as applied to the lobster on the coast of this State, have decreased nearly one-half in the short space of four years. From what we gather, they are practically exhausted in the Buzzards Bay region, including the Elizabeth Islands in particular. While this apparent condition may be partially due to the alleged disinclination of the fishermen in that section to furnish egg-bearing lobsters for the purpose of artificial propagation, the evidence of lack of satisfactory reproduction among the lobsters off the southern shores of the Commonwealth is sufficiently great to indicate that the long-threatened commercial extinction is near enough there at least to cause grave apprehension. If it means anything, it means a growing dependence on artificial propagation; and we have seen that fish culture is growing less and less able to deal with the problem, even when Massachusetts is getting more than her share of its benefits, — a condition that can scarcely be expected to last longer to the same degree, for the new hatchery established this year on the coast of Maine may naturally be expected to utilize all the egg-bearing lobsters obtainable along the shores of that State.

The statistical returns of the lobster fishery show an increase of 63 pots and a decrease of 6,664 lobsters, or about two-thirds of one per cent. It is believed by some that the catch would have equalled or exceeded that of last year except for hard storms that destroyed more or less gear, and temporarily interrupted fishing. As an instance of the effect of the summer gales, Mr. Stillman C. Cash, a lobster fisherman of Nantucket, returned unfilled the blank that was sent him, with

the following statement, dated October 20, under the head of "Remarks : " —

I am sorry to make this report on lobsters, nevertheless, it is correct. W. F. Brownell, A. Dunham, George Buckley and I got ready to put into the water 20 traps.* The cost of these traps, with ropes and anchors, was \$54. We put them into the water, and a gale came up about June 20. We lost everything, and have not seen any part of them since.

Deputy W. W. Nixon of Gloucester reported on May 10 that the prevalence of storms during the spring had been very severe on the lobster fishermen, and had caused some of them to lose many of their pots. As a matter of fact, some of them lost nearly all they had set. He cites an instance where a fisherman lost 39 out of 40 pots, which he had in the water in one storm about the last of April or the first of May. In his annual report he alludes to the influence of storms on the fortunes of the fishermen. He says : —

This has been a poor year, fishermen say, owing to the frequent and long-continuing storms, which have caused the loss of, in some cases, all the pots. Fishermen are in favor of a close season and a license.

At an earlier date, — August 30, — and while the weather was normal, he stated that : —

Lobsters are reported very scarce in this vicinity at present, and all the fishermen with whom I talk are in favor of a close season, as that is the only way to save the lobster from being exterminated.

From this it will appear that there were other causes for a "poor year" in the lobster fishery than storms, although the damage done by them along many sections of this coast was often severe, and was frequently alluded to by the fishermen in their reports, in which they also took occasion to express their opinions concerning the protective laws. The following is a good example. Robert F. Swift, a lobster fisherman of Chiltonville, writing on October 22, says : —

* Presumably he means 20 traps each.

The fishermen have had a successful season this year, barring the severe storm of last week, which wrought much damage to their gear. It has practically put some of the men out of the business for this season. On an average, they have lost one-half of their gear.

Lobsters are quite plentiful now, and of good size.

The 10½-inch law is all right. As a general thing, it is respected and lived up to here; would rather have it 11 inches than less than 10½. We are in the lobster business here for our bread and butter, and realize that unless they [lobsters] are protected we are the sufferers.

As a rule, the fishermen seem to favor a close season, as reported by Mr. Nixon. The following is an example of a fisherman's opinion along this line. Philip M. Brown of Houghs Neck, Quincy, in submitting the returns of his lobster fishery for the current year, wrote substantially as follows:—

If the opinion of an old fisherman regarding the protection of lobsters is worth anything, I think there should be a uniform close season, as a law of that kind is the only one that can be enforced. To comply with the 10½-inch law, 18 lobsters out of every 28 taken must be thrown away; and a fisherman is a very good man or a very great fool to throw away two-thirds of his catch, that the coming generation may have a luxury. So the lobsters are slaughtered the same as if no law existed.

Statements might be multiplied which would indicate the feeling of the fishermen and the status of the fishery. They can, however, be summarized by saying briefly that the expressions most frequently heard were in favor of a close season—term usually unstated—and a permit system, by means of which those engaged in the fishery can be known, and the industry can be more effectively controlled, whereby the fishermen can be benefited, as the more intelligent of them can see. Although there always will be many who, like him who has been quoted, look only to the present moment, and object to any action or restriction which may preserve for “the coming generation” what he terms a “luxury,” it is gratifying to know there are some of the fishermen holding vastly broader views, and who, like Mr. Swift, are wise enough to clearly see that unless the lobster is properly protected, the fishermen, of all men, will be “the sufferers.”

It is, however, scarcely worth while to add to this discussion here, for various reasons, chief of which is the fact that the lobster question will be rather fully dealt with in the special report on the lobster convention which met at the State House September 23 and 24, for the purpose of reaching some common basis of action for the better preservation of the lobster by the lobster-producing States. This will be printed as a separate report.

In view of the anticipated action of the Legislature in authorizing the commission to call a convention of the commissioners of the lobster-producing States and Provinces, and realizing that the lobster fishery on the coast of Maine is the most important left to the United States, the chairman availed himself of the courtesy of Capt. E. E. Hahn, commanding the United States Fish Commission schooner "Grampus," to accompany that vessel on a cruise to the coast of Maine during the latter part of April, where she went to collect egg-bearing lobsters with which to carry on the important work of artificial reproduction, which the national commission has been engaged upon during a series of years in its attempt to check or delay the decimation of our most valuable crustacean. The chairman also embraced this opportunity for a much-needed rest from exacting and wearing official duties. He joined the "Grampus" at Gloucester on the afternoon of April 22, and sailed on her the next morning to the eastward. He left her at Portland, Me., on the evening of April 30, and returned to Boston. Meantime, the vessel had visited all the leading lobster centres from Kennebunk and "The Beach," just west of the entrance to that port, to Rockland, and at every place the utmost zeal and diligence were exercised to carry out the purposes of the cruise. Just previous to this trip the weather had been exceptionally severe for the season, with fierce easterly and north-easterly gales and high seas, resulting in the destruction of a lot of lobster-fishing apparatus that venturesome fishermen had set. This result had the effect of deterring the fishermen from engaging as heavily as usual in the fishery at the time of our visits, notwithstanding the weather was unusually fine and moderate. As a consequence, it was difficult for Captain Hahn to obtain more than a few "seed" lobsters.

The important thing, however, that came under the observation of the chairman was the fact that not alone were “seeders” very small and scarce, but that there was a general complaint of the scarcity of lobsters along the coast; while observation showed clearly that over-fishing was having the same effect on the size of the lobster in Maine that is so painfully apparent along the coast of Massachusetts. It is, therefore, evident beyond the point of successful refutation, that, if the lobster is to be preserved from ultimate destruction in this country, it is high time that some effective action should be taken which will have equal application to all the lobster-producing sections.

Sea Fisheries.—The importance of the sea fisheries of this State has always been recognized, for, since the beginning of American history, Massachusetts has held a premier position in the fishing industry. She is the foremost State to-day in sea fishery. There are not, however, any recent statistics available which show comprehensively the present status of the fisheries from the shores of this Commonwealth. An idea of them can be gained, nevertheless, from a consideration of the food products landed by fishing vessels at Gloucester and Boston, as shown by bulletins published by the United States Bureau of Fisheries.

During the year ending Oct. 31, 1903, 162,758,830 pounds of fish products, with a value, at prices paid the fishermen, of \$4,443,383, were landed at those two ports by the fleets marketing their catch there.

During the calendar year of 1902, according to the same authority, 167,954,875 pounds of fishery products, having a value of \$4,379,082, were landed at Boston and Gloucester. These figures show a less value than for the present year, although there was a slightly larger quantity of products; this indicates higher prices in 1903.

Of the fish landed in 1902, 62,932,349 pounds, valued at \$1,694,259, came from the fishing grounds east of 66° west longitude; and 105,022,526 pounds, with a value of \$2,684,823, were the product of areas west of that meridian.

Of the fish landed at the two ports in the year ending Oct. 31, 1903, more than two-thirds, or 112,865,267 pounds, were fresh, and 49,893,563 pounds were salted. While the tendency is to market an increasing percentage of fish fresh each year,

the fact should not be lost sight of, that, under the system now in vogue for selling fares of fish, considerable quantities that are landed fresh from so-called "shack trips," or surplus lots of fresh fish from over-stocked markets, are subsequently salted, and some are also smoke-cured, and they go into the country's markets as salted or smoked products.

The enhancement of value of fishery products at the receiving ports by curing, packing, refrigeration and other forms of preparation is material, and often reaches a large percentage, — 100 per cent. or more. Thus the figures given do not convey a fair idea of the fish trade of the two leading fish markets of Massachusetts. A few years ago Boston alone had an aggregate wholesale fish trade little short of \$11,000,000 annually; it may be larger than that now; and the value of the fish products that go out from Gloucester, after curing, packing or otherwise preparing them for use, must be largely in excess of the sum paid to the fishermen for what may be termed raw products, — the fares from its fishing vessels.

The prosecution of various fisheries in the open ocean, often far from land and frequently in semi-arctic regions, under all the varying meteorological conditions of the changing seasons, unavoidably exposes to great hardship and peril the brave and hardy men trained in these industries. It thus follows that each year the fisheries pay a ghastly tribute of drowned men, who, despite professional skill in the management of boats or vessels, meet an untimely fate. The very daring which is so necessary for the successful prosecution of sea fishery is sometimes too excessive, and disaster results.

As usual in recent years, the fatalities in the fisheries have been chiefly due to the stranding of schooners in thick weather, and to accidents to dories going out from vessels on the banks to attend to trawl lines. Happily, the horrors of other years, when it was common for fishing schooners to go down at sea with all hands, — sometimes several foundering in a single gale, — are seldom repeated, and it is comparatively rare now that the fateful word "missing" is written against the name of a fishing vessel. Occasionally, however, a schooner of an old design, perhaps otherwise unfitted to encounter hard weather, is caught in the embrace of a fierce gale, and succumbs; or she

may meet disaster in some other unknown way, and disappear without the faintest trace remaining of her or her crew. Such an event has occurred this year, but there is occasion for gratitude that disasters of this kind are not more frequent.

Two of the saddest and most disastrous shipwrecks on record in the history of the fisheries happened this year, when the vessels were stranded while running in bad weather, and nearly all the men of their crews perished. The schooner "Gloriana" of Gloucester, while running in from Sable Island bank in a dense fog, ran on shore early in the morning of May 6, on the cliffs at Whale Cove near the eastern part of Nova Scotia. Fifteen of her crew of eighteen were drowned, and the survivors had a narrow escape. They spent the appallingly long hours of darkness, after they reached the shore, upon the wild, spray-drenched cliff, against which their vessel was being ground to atoms. Daylight brought them assistance.

A similar disaster took place about the middle of September, when the mackerel fishing schooner "George F. Edmunds," also of Gloucester, while running for Boothbay harbor at night on the approach of a storm, and while the weather was thick, struck on Pemaquid, and only two of her crew of seventeen men were saved.

These sad events — startlingly sad in their details — were out of the ordinary, for the crews of stranded vessels are usually rescued, and the communities where they belong are thus saved the horrifying shocks that come when such terribly fatal shipwrecks occur.

There were the usual narrow escapes from death by going adrift in dories, and meeting with other mishaps incident to the fisheries. In one case two men, who went astray June 14 from the schooner "Monitor" of Gloucester, while attending their trawls on the fishing banks off Newfoundland, were adrift for eight days without food or water, and barely escaped with their lives by being picked up by the men on a boat from the Newfoundland schooner "Gleaner," after those adrift had become exhausted from exposure to cold and lack of sleep, food and water. Their hardships were so extreme that they had become insensible, — after they laid down to die, — and their boots had to be cut from their swollen feet and legs after they

were taken on board the "Gleaner." Many narrow escapes resulted from the sudden drive of a fierce snowstorm that swept down upon the market fleet fishing off Cape Cod in late December, and two fishermen who were not fortunate enough to be rescued froze to death in their dory, and were found later stark and stiff in their boat.

Interesting as these adventures are, however, of which details could be given, the space available does not permit of more than a passing notice of the more remarkable, since we can scarcely venture beyond the bare mention of the loss of life in the fishery, and consequent bereavement of wives and children.

Aside from the fatalities incident to the stranding of vessels, to which allusion has been made, and the deaths of fishermen from disease or by being killed by accidents that might not be strictly considered by some as coming within the classification of deaths as a result of fishing, the loss of life for the year has been remarkably small; in some particulars, and especially in the matter of being lost or drowned while out in dories on the fishing banks, it has been almost phenomenally so. From the records we find that 72 men, not including those who died in hospitals or from accidents not directly connected with fishing, were lost. It is stated that the fishermen who were lost or died left 20 widows and 54 children,—a sad record, even if it is in a degree less distressing than in other years of the past.

Of those who can be considered as having lost their lives while engaged in fishing, 30 men were drowned as the result of the stranding of two vessels; 14 were on a schooner that foundered at sea, going down with all hands, without any information reaching the home port of the time and circumstances of her loss; 12 men were washed overboard in gales from the decks of vessels; 10 men were drowned in consequence of the capsizing of dories, etc.; 4 men went astray in dories and were not subsequently heard from, and 2 men froze to death in a dory while astray, and were picked up afterwards. Those not found probably died from hunger and thirst, unless a Divine Providence vouchsafed to them a more merciful departure from life.

It is noticeable that only a little more than half the fatalities occurred in the open ocean, as a result of the foundering of vessels, dories going astray or capsizing, etc.; and, except for the unusually sad results incident to schooners running on shore, this year might have been one in which the loss of life would have been remarkably light.

The single vessel lost with all her crew was built in 1885, before the marked improvement in designing fishing schooners, due to the building of the United States Fish Commission schooner "Grampus," which was designed by the writer; and it is not uncommon for crafts of the old, shallow type to be lost at sea, although so few are now used, especially in winter, that it is comparatively rare for a schooner not to return, and be listed with the "missing."

The loss of fishing vessels from the Gloucester district for the eleven months ending October 1 was reported to have been 6, with an aggregate tonnage of 527.01 net tons, and valued, with their cargoes, at a total of \$66,500. Since then there have been at least 5 vessels lost by stranding from that district, 4 being sailing schooners, and the other the nearly new steamer "Alice M. Jacobs," reported to have been wrecked the middle of December, on the Newfoundland coast. The former were probably valued, with their cargoes, at about \$54,000, and the estimated value of the latter has been given at \$25,000. It will thus be seen that the total property loss from the wrecking of fishing vessels of the Gloucester district alone reached a total of about \$145,000 for the year. Fortunately, the stranding of the vessels last mentioned involved no sacrifice of life.

The drain upon Gloucester from the fatalities in its fisheries may be judged from the fact that the records show that, since 1830, the ghastly tribute exacted from these industries has been 5,122 men, who have left to mourn their loss 1,019 widows and 2,034 children. Is it necessary to discuss the courage of those who, in the face of such well-known facts, go out to sea unflinchingly to meet the perils that have caused such a loss of life? Perhaps in no other community can such a record be found.

In addition, 5 fishing vessels, of 225.96 net tons, from other

Massachusetts ports, were lost by stranding, but without loss of life. This makes the aggregate losses of property about \$165,000.

Considered from a meteorological point of view, and the influence of weather upon the fishery, 1903 has been a remarkable year, and may perhaps be placed in the category with the worst fishing seasons of a century. The winter months at the beginning of the year were characterized by fierce gales, that often were so continuous as to prevent fishery for days or weeks at a time. In this regard they were extraordinary even for the wild, wintry regions of the north Atlantic, frequented by our fishing fleets. But severe as the winter was, even to the point of establishing a record for unfavorable fishing weather, it was not so remarkable — certainly not so unseasonable — as the weather during a part of the summer.

The spring opened fairly well for fishing, from a meteorological point of view; and May was especially fine, having many warm, summer-like days, which were favorable for all kinds of sea fishing, particularly for catching mackerel. But at the very close of May the weather changed, and for the whole month of June it was cold and rainy, with fresh to heavy north-east gales most of the time. Its severity for midsummer was unparalleled for many years; since careful records of the weather have been kept, nothing like it has been seen at that season, and it probably had not been equalled in summer for nearly a century.

Fishing of all kinds was interfered with materially, and some branches could scarcely be prosecuted for several weeks. This was especially true of the mackerel fishery, for the season which should have been the most favorable was disastrously severe, being almost a continuous succession of gales, storms and rough seas, during the prevalence of which it was better to lie in harbor and avoid mishap.

The spring mackerel fishery opened about as usual. As early as the latter part of February incoming vessels reported schools of mackerel as having been seen off Cape Hatteras. Not long after that some of the fleet began to fit for the southern fishery, and two schooners, the vanguard of this fleet, were reported to have sailed on March 19. At that time some fifty

sail more were getting ready, and they were soon at sea. There were later additions to the fleet, which had about the usual proportion of seiners and drifters. The latter use long gangs of gill nets fastened together end to end, that are set ahead of a vessel, which is connected by a hawser to the lee end of the nets, and drifts along slowly, dragging the nets after her, as she lies quietly, with only sufficient sail set aft to keep her steady and head to the wind. This drift-net fishery employs a number of small vessels, and has grown in favor in recent years.

The first schooner to bring in a catch of mackerel was the "Ralph Hall" of Gloucester, which landed 10 barrels at Fortress Monroe, Va., on April 9. The takes throughout the early spring were generally small, and at times the arrival of numbers of the small drifters, with fares ranging from 300 to 5,000 or 6,000 fish in number, were the most frequently noticed in the press.

There was an absence of the extraordinarily large catches which have been made by the seiners in other springs. These did not occur to any noticeable degree until late in spring, and for a while the outlook was discouraging. Even toward the end of April fares ranging from 100 to 300 barrels of mackerel were considered good; and the spring months appear to have passed without any startlingly large takes, the nightly catches of the little netters seemingly being much in evidence in supplying the market. Thus the Boston "Globe" of May 21, 1903, recorded the fact that there were only two seiners reported at New York that morning. One of those had 200 barrels and the other only 20 barrels, — a quantity that would scarcely have received notice in those seasons when mackerel were abundant.

At the very end of May and during June the schools of mackerel "showed up" better than earlier in the season, and whenever a day occurred that was suitable for fishing, a good catch was generally made. Meantime, the fleet had scattered somewhat, and a part of the vessels were off the south coast of Nova Scotia, — usually termed the "Cape shore," — while others remained farther south.

On June 4 it was reported that the fishing steamer "Alice

M. Jacobs" had stocked \$8,000 on a fare of fresh mackerel that she brought to market from the Cape shore, and this was said to have been the largest stock ever made on a single trip up to that time. The men of the crew shared \$158 on this cruise of only a few days. It would appear that several good fares were caught at about the same time off the Nova Scotia coast, for two days later it was reported that the sailing schooner "Bertha and Pearl" of Gloucester landed a catch that sold for \$7,725, her crew sharing \$186.12 each. The schooner "Kentucky" was reported the same day to have brought in a fare that sold for \$5,000.

A few other vessels were fortunate at this time, or some days later; but the bulk of the fleet did poorly, so that the general average of the catch on the Cape shore was not large. Some of the vessels that were lucky got more than one good fare, but most of them got comparatively few fish. Thus the steamer "Alice M. Jacobs" was reported on June 23 to have landed a fare which sold for \$5,860. On June 19 the Boston "Globe" reported the arrival of the schooner "Constellation" with 100 barrels of fish which had been caught and brought to market within twenty-four hours after the vessel sailed from home. A similar event was reported June 27. The schooner "Agnes E. Downs" sailed from Gloucester in the morning and returned to port before night with a catch that gave her a stock of \$1,400.

During July the weather was better than for the previous month, and some fine catches were made. The "Cape Ann News" of July 7 reported that the "Alice M. Jacobs" had just landed a catch of mackerel that gave her a stock of \$3,400, and brought her total stock for the season, to that date, up to \$19,700. The same paper reported the arrival of the schooner "Marguerite Haskins" of Gloucester at Newport with a fare of 700 barrels of mackerel. On July 21 it reported the arrival at Newport of the schooner "Nourmahal," and that she had stocked \$3,566.84.

During August, and especially near the close of the month, some large stocks were secured. The "Cape Ann News" of August 29 records the fact that the steamer "Alice M. Jacobs" had just landed a fare that sold for \$10,200, her crew sharing

\$220.50 each for a five weeks' trip. The auxiliary schooner "Constellation," as the result of a week's trip, had a stock of \$8,000, the crew sharing \$176.86 each; and several other vessels had arrived with good fares, but of less magnitude than those we have mentioned.

In September some large catches were also made. One of these established a record that may not easily be surpassed. Strange though it may appear, this fare was brought into Gloucester and subsequently taken to Boston by the steamer "Alice M. Jacobs," whose previous big fare was reported in the press only eleven days earlier.

The Boston "Herald" of September 10 reported her arrival at Gloucester the day before with about 300 barrels of salt mackerel and 55,000 fresh fish, approximately 700 barrels, making a total of about 1,000 barrels. The steamer had been only nine days from home. It is stated that she took the first mackerel—nearly 700 barrels—at one cast of the seine. She was credited with a stock from the sale of these fish of \$11,000 in round numbers.

The schooner "Kentucky" arrived at Gloucester the same day with a fare of 552 barrels of salt mackerel, which sold for \$14 per barrel, giving a stock of \$7,728.

Other large catches could be cited, but those mentioned are sufficient to show that extraordinary fares were made by some of the vessels, and, notwithstanding the season as a whole was not notably a prosperous one, the earnings of some schooners were greater than in 1902. The fact that within two weeks one vessel landed exceeding 2,000 barrels of mackerel and stocked more than \$20,000 might be considered no less than remarkable under the most favorable conditions; but that this record should have been made in the season of 1903 is a suggestion of what may be possible of accomplishment by a steamer in a year when mackerel are as plentiful as they have been.

The mackerel season ended early, as far as good catches were concerned, for, although a few of the fleet continued in the fishery until November, the fishermen hoping that migrating schools might be found in abundance late in the year, comparatively few fish were taken after the middle of September. A

large number of the fleet abandoned the pursuit of mackerel in late September and early October, and engaged in other branches of fishery, or hauled up for the winter; others dropped out of the fishery from week to week, as the season advanced, and mackerel could not be found in paying numbers; and those that cruised until late met with poor success or absolute failure. This indicates an unusual early departure of the mackerel on its fall migration, for there was much fine autumn weather, and consequently ample opportunity for fishing, if there had been any fish to catch.

Among the most notable stocks earned in the mackerel fishery during the season of 1903 the following may be mentioned:—

The steamer “Alice M. Jacobs” stocked \$43,000 mackerel fishing; her gross stock for eight months and nine days, from March 10 to Nov. 19, 1903, was \$56,000. It was \$48,500, including only the net earnings from a trip to St. Pierre in March, before starting in the mackerel fishery, and a salt herring trip to Newfoundland during November, after the close of the mackerel season. She had the record stock in the mackerel fishery, and also the record stock for eight months in the Atlantic fishery. Compared with the high-line stocks of forty years ago, in the days of abundance of mackerel, when it was extraordinary for a schooner to stock \$12,000 or \$15,000 in the mackerel fishery, this stock of \$43,000, reported by Captain Jacobs, for a mackerel season that was not especially a favorable one, can be considered little less than marvellous. The fact that this steamer earned a stock in nine days this year that compared favorably with the highest season’s stocks of the sixties seems almost like a fairy tale, yet it is true. The efficiency of steam is thus demonstrated and its earning capacity once more established, regardless of the expense attending its use.

The auxiliary schooner “Constellation” stocked \$29,000.

The sailing schooner “Bertha and Pearl” stocked \$23,000; the crew shared \$540 each. The catch of this vessel was made in about six months’ fishing, for she was one of those that quit the mackerel fishery early. The stock, which under any circumstances was a remarkable one for a sailing vessel, was all the more so because the master, Capt. Joseph Smith, is approach-



Fig. 1. Auxiliary Schooner "Constellation" under Sail and Power.
Photographed by H. W. Spooner.

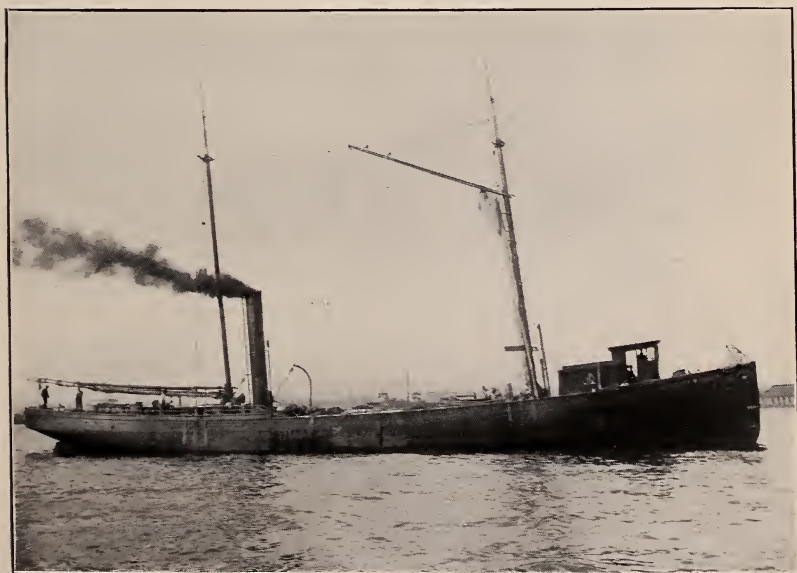


Fig. 2. Mackerel Fishing Steamer "Alice M. Jacobs."

ing three score and ten years of age; it is worthy of record that one should retain at that age the vigor and endurance necessary to carry him successfully through a season of heavy fishing, which was sufficient to tax to the limit the strength of a hardy young man.

The schooner "Kentucky" stocked \$22,000 in the mackerel fishery, or \$32,000 as a total (including the haddock fishery), for nine months' fishing, from Jan. 1 to Sept. 29, 1903.

The schooner "Navahoe" is credited with stocking above \$20,000, her crew sharing \$462 each.

Among the interesting incidents of the year's mackerel fishery was the trip of a single vessel—the old schooner "F. W. Holmes"—to the Gulf of St. Lawrence, where formerly it was customary for a fleet of several hundred sail to go. She fished with drift nets, but was not very successful. The former great mackerel fishery in the Gulf is a matter of history; at present the fishery there is of little consequence.

As will be seen, the two highest stocks were made by power-driven vessels. That of the steamer "Alice M. Jacobs" is a record in the mackerel fishery, and exceeds the record she made in 1902. With her, as with nearly all of the other vessels that got large stocks, the money earned in the mackerel fishery represents only a portion of the year's stock. For instance, the "Alice M. Jacobs" was actively at work in the early part of the year before she entered into the mackerel fishery, and early in December, 1903, brought home a cargo of salt herring from Newfoundland, and was soon off on her second trip of the winter, during which she was lost.

According to the Boston Fish Bureau, the total catch of mackerel by the New England fleet during 1903 was 114,658 barrels, of which 44,012 barrels were salted and 70,646 barrels were marketed fresh. The catch exceeded that of 1902 by 6,000 barrels, as given by the authority referred to. Prices were high this year, however, both for salt and fresh fish, and gave remunerative returns for the fishery.

So far as we are informed, no large auxiliary schooners with naphtha engines have been added to the mackerel fleet during 1903, and we have not heard that there is a disposition to build any new vessels of this type in the immediate future. It seems

probable that there is a disposition on the part of the owners of this class of vessels to give those they now have a thorough trial before venturing farther in the same direction, while others may likewise be awaiting results before changing from sailing schooners. It is also possible that, in view of the remarkable success met with by the steamer "Alice M. Jacobs" and the greater reliability of steam, many may be hesitating in their choice between steam and naphtha engines. However this may be, so far as the mackerel fishery is concerned, the use of power other than sails will doubtless ultimately come into vogue in the deep sea fisheries; and, when properly built and engined power-driven craft are introduced into the market fishery, the change to them from sailing vessels is liable to be rapid. Some small auxiliary fishing vessels have been added to the fleet.

The current year has generally been a very unsuccessful one in the salt cod fishery on the banks, and it has seldom happened that the vessels engaged in this branch of fishery have done so poorly. A scarcity of fish, but especially a remarkable scarcity of bait at Newfoundland ports, — schooners sometimes being compelled to wait days and weeks for a supply of bait, — made it difficult for the majority of the vessels to secure full fares in a reasonable time, and some returned from their voyages with only partial fares.

One experienced master, who was more than five months securing a fare, reported that he had cruised over all the banks from Sable Island to the Flemish Cap, and fish had been found scarce wherever he went. There were frequent occasions when scarcely a single fish was caught on the trawl lines. On the Flemish Cap, the north-eastern of all the great cod fishing banks, it had formerly been customary to catch fish on what is known as "shack bait," — sea birds, fish roe, etc., — but the cod would not bite at it this year, and no fish could have been caught in early summer except for the salt capelin he had supplied himself with. After the capelin was used, no bait could be secured on the fishing grounds nor along the coast for a long time. The whole of August was lost in searching for bait. No similar condition had been previously known, for squid usually are very certain and regular in their visitations

to the coast. But they could not be found. Fishing vessels were everywhere along the Newfoundland coast searching for them. They cruised a distance of 600 miles, without result. Finally, after weeks of fruitless search, squid were found; a supply was obtained, and the captain ran off to the Grand Bank, where, even with good bait, only a small catch of cod could be secured. Later he fished farther to the south-west, not far from Scatari Island, off the south-eastern point of Cape Breton Island.

Experiences similar to the foregoing, or worse, were common, and accounts of them could be multiplied. They caused a shortage of the fish supply from the banks. As a result, prices ruled high; consequently, the schooners that were fortunate — and some were extremely lucky — earned large stocks; they were more successful financially than would have been possible with the same quantity of fish in a season of normal abundance of cod and bait species, when earnings would have been more equally distributed.

Among the high line stocks reported were the following: —

The schooner “Elector” of Gloucester made three successful trips, — the only vessel of the bank fleet to make three trips, — and landed about 750,000 pounds of salted cod; she stocked \$23,012. This stock was nearly a record, for, so far as can be learned, it has been equalled but twice in the history of the bank fishery. One year, some time ago, the schooner “Bessie M. Devine” was credited with stocking more than \$23,000 in the bank cod fishery; and in 1901 the schooner “Aloha” of Gloucester made three trips dory hand lining, and earned a stock of about \$24,000. This is still the record.

The schooner “Mabel D. Hines” of Gloucester stocked \$16,712; her crew shared \$606 each.

The schooner “A. E. Whyland” of Gloucester earned a stock of \$12,112.44 from a single fare of 318,044 pounds of cod. The trip continued about five months, much time being lost in waiting for bait. Her crew of 18 men each shared \$311.57.

The schooner “Essex” of Gloucester stocked \$7,253.49 on her first trip and \$9,206.56 on her second fare, making a total stock for the season of \$16,460.05; her crew shared \$394.70 each.

About October 20 the schooner "Independence" of Gloucester landed a fare of salt cod that weighed 313,267 pounds. She stocked \$12,153.17, and her crew shared \$330.50 each.

Among the early trips to the banks, one of the most successful was that of the schooner "Maggie and May" of Gloucester. She was reported on July 20 to have landed a fare of 305,916 pounds of salt cod, which sold for \$9,304.38; the crew shared \$315.38 each.

About the same date the schooner "Valkyrie" of Gloucester landed a bank fare of 299,000 pounds of fish, that gave her a stock of \$8,764.33.

The schooner "J. J. Flaherty" of Gloucester, which made an extraordinary catch last year, was high line of the dory hand line banking fleet from Gloucester. She landed 450,000 pounds of cod in two fares.

The schooner "Arcadia" of Gloucester landed a single fare, about November 18, that weighed 297,000 pounds. She stocked \$10,524; the men averaged a share of \$250 each.

In recent years the so-called "shack" fishery has grown in importance as a branch of the cod fishery on the banks. The fishing grounds usually resorted to are not distant, they are seldom as far as Sable Island; and the purpose is to catch various species of the *gadidea*, — cod, haddock, hake, cusk and pollock, — eviscerate them, and bring them home unsalted. Because the fish are mixed, and generally mostly of the cheaper grades, they are called "shack," and the fishery for them is known as "shack" fishing. These trips are generally short; they vary from two to perhaps six weeks in length, the time usually depending largely upon how long it takes to get bait, as well as how long the catch can be kept fresh in ice fit for splitting; generally only a small percentage are suitable to be sold for consumption as fresh fish.

The fishery is prosecuted with trawl lines, similar to those used in the haddock fishery. Fresh bait is carried, and large quantities of gear are used. The catch is correspondingly large, and sometimes the vessels, which are generally smaller than those that go to the distant banks, are loaded in a few days.

As indicated, the fish are as a rule eviscerated and packed in

ice. They can be rapidly handled in this way, and large catches are stowed away in a brief time. When the vessel arrives, the fish are sold "round;" they are then split and salted on the wharves, and thus become a part of the salted product, except as far as some are sold fresh for immediate consumption. Some fares are salted on the vessel, in part. The fishery is carried on chiefly or wholly during the warmer months of the year. Sometimes the vessels make good stocks in a few days, or for the season. These earnings, combined with those in other branches of fishery, notably the market fishery, often reach large totals. A few of the most notable stocks, taken at random, follow: —

Near the last of September the schooner "Slade Gorton" of Gloucester landed one of the largest fares of mixed fresh fish ever taken into a New England port. These fish weighed 183,000 pounds, and she stocked \$4,200; each of the crew shared \$101. The trip occupied six weeks, but a large portion of this time was used in hunting for bait, the search being carried on the entire length of the Nova Scotia coast.

The schooner "Olga" landed a shack trip at Gloucester, about June 20, of 79,000 pounds of fresh and 25,000 pounds of salted fish, which sold for \$3,106; the crew shared \$102.10 each. She was absent three weeks.

The schooner "Vera" of Gloucester arrived home on July 11 from a "shacking" trip with a fare of 130,000 pounds of fish that were caught on St. Pierre bank, with capelin bait that had been obtained in a Newfoundland port, — the first time in the history of this fishery, so far as we are aware, when bait for a shack trip had been procured so far east. It is also unusual to fish so far from home on a trip of this kind.

Between August 8 and 11 two remarkable shack fares of fresh fish arrived at Gloucester. One of these was brought in by the schooner "Fannie A. Smith" of Gloucester; she was reported to have 190,000 pounds of fish. The schooner "Pinta" of the same port had 160,000 pounds. The "Smith" made her trip in less than three weeks, and the large fare of the "Pinta" was caught in less than ten days.

On June 29 the schooner "Fanny Belle Atwood" landed a

shack fare at Boston that sold for \$3,800. This was the first trip made after the vessel was launched.

The "Rip fishing" differs from the shack fishery chiefly in the fishing ground resorted to, and in the fact that a large percentage of the fish taken on the Nantucket Rips are cod. Comparatively small schooners engage in this. The schooner "Thalia" of Gloucester was reported to have stocked \$9,000 in this fishery between May and November, during which time she landed four fares of fresh fish and six fares that were salted.

The bait question in connection with these secondary bank fisheries — the shack fishery and the Rip fishery — is an important one; and at times the fishermen have resorted to the use of cockles for bait, and have found them very desirable as a lure. Strange as it may appear, the claim is made that cockles, as well as other bait species, were extremely scarce; besides which, it has been alleged in the press that the fishermen claim that those who furnish cockles for bait have formed a trust.

We are not aware that mussels have been utilized as a bait supply by our fishermen. Those bivalves are largely used in Great Britain; and, in view of the extensive beds of them available in New England, they will constitute a bait resource of large consequence, if it is found here, as in Europe, that they are attractive to fish. We suggest that a trial of this kind of bait be made, to test its usefulness.

The Georges cod fishery appears to have been more or less unfavorably affected, as the other branches of the cod fishery were.

The result of all this has been a shortage in the supply of fish, and a consequent seeking of additional supplies in the British Provinces, especially Newfoundland, from whence cargoes have been imported to meet the demand.

A few matters of interest in connection with the cod fishery have occurred which deserve mention. The Boston "Globe" of Oct. 27, 1903, says:—

The water about Hull, especially in Hull Gut, off Pemberton, is teeming with cod. . . . Natives standing on the beach, casting lines into the tide, baited with clams, have caught large quantities, some weighing over twenty pounds each. . . . One old resident, who has

caught several twenty-pounders, says he remembers when he was a boy large quantities were caught from the shore of Hull Gut. . . .

Cod were also reported in abundance in the estuary at the mouth of North River, and along the coast off Marshfield and Scituate.

Many have surmised that the presence of cod in such large numbers in-shore was due to the hatching operations of the federal government on the coast of the State, and such belief should be very comforting. Except for the fact that a similar condition has occurred here and elsewhere in other years, long before the artificial propagation of cod was attempted, — probably before it was thought of, — and the additional fact that the cod is sometimes erratic, to the extent of gathering in great numbers where least expected and then being absent or scarce for years, this appearance of cod in our in-shore coast waters might be unhesitatingly credited to the effect of fish culture.

The capture of a cod off Race Point, which was reported to weigh 104 pounds, shows that fish of this species of extraordinary size are occasionally taken near the land. The claim that this was the largest cod ever taken was grossly erroneous.

The market fishery for haddock, cod, etc., which is prosecuted chiefly on some of the outer fishing grounds, — mostly from 75 to 300 miles from the ports where the fish are sold, — has been generally successful ; and, as usual, some large stocks have been made in this industry, despite the fact that the fishery has sometimes been severely handicapped by long-continued periods of bad weather. Among the extraordinary stocks were the following : —

The schooner “ Olivia Dominoas ” of Gloucester was launched in March, 1903, and previous to November 10 she had stocked \$19,205.43 and her crew had shared \$780 each as the result of fishing seven and a half months. The vessel’s earnings were at the rate of nearly \$32,000 per year.

As an instance of remarkable success in the market fishery, the Gloucester “ Times ” of May 19, 1903, notes that the schooner “ Catherine and Ellen ” of Boston had stocked \$49,100 in less than a year. Her year ended May 11, but a week later she had arrived with a large fare which would carry her earn-

ings for fifty-three weeks beyond \$50,000. This is a record for a sailing vessel that is truly remarkable and one not easy to surpass. This vessel stocked \$44,000 during 1903.

The schooner "Manhasset" stocked \$46,000, the schooner "Benj. F. Phillips" \$40,000, and the schooner "Mary Cooney" \$25,000.

The schooner "Philip Manta" of Provincetown was reported, on Oct. 26, 1903, to have stocked \$27,000 since the beginning of the year, her crew sharing \$835 each, — a good result for less than ten months' work.

The schooner "Navahoe" of Gloucester, whose stock in the mackerel fishery has been mentioned, was reported on March 19 to have stocked \$15,000 in the winter market fishery.

The largest fare of fresh fish brought in by a market schooner during the current year, and probably the record fare in this fishery, was 170,000 pounds, which were landed June 8 by the Boston schooner "Metamora."

Other vessels have brought in large fares, and several have earned stocks deserving of mention, but lack of space precludes their consideration here.

The year's market fishery was notable for a record high price for fish, caused by a dearth of ground fish in the market about the middle of October. The long-continued prevalence of gales and storms prevented fishing for such an extended period that the market was stripped of a supply of fish; consequently a small catch that arrived on October 17 was reported to have been sold at prices higher than ever were paid before. A had-dock that weighed $17\frac{1}{2}$ pounds, after evisceration, was said to have been the largest fish of the species ever landed at T wharf.

A remarkable innovation is the sale of sharks for food. These are eaten to a considerable extent by natives of southern Europe now resident in the United States, and are in demand in the markets of distant cities, as well as those nearer. A considerable number of them are brought in, and to the extent that they yield a return to the fishermen the industry is benefited. The Boston "Globe" of Oct. 6, 1903, in its reports upon arrivals at T wharf with fish, says: —

Several of the schooners brought in small sharks, which are now caught, and bring a price for the markets supported by the foreign population.

If the dogfish, which is a small species of shark, could be disposed of in like manner, much benefit would result, — to the consumer in getting an inexpensive article of food, and to the fishermen in the profitable utilization of a species which has become so numerous that it is a dreaded scourge of the fishing grounds. Whether the dogfish can be utilized for the manufacture of a fish meal for food, similar to the fish meal produced in Norway, which can be used for animals, poultry, etc., as well as for men, is a matter that should receive the earnest and careful consideration of those engaged in the preparation of fishery products.

The pursuit of the swordfish is becoming a feature of the market fishery of some consequence, employing a number of schooners that are now reckoned as “small,” although many of them would have been rated as large vessels forty years ago. Some of the vessels also engage in the trawl line fishery, the catching of swordfish being secondary; others may catch mackerel, as well as swordfish. For this reason it is difficult if not impracticable to give special figures for the swordfish fishery. As bearing on the importance to which the fishery has attained, the Boston “Globe” of July 13, 1903, published the following: —

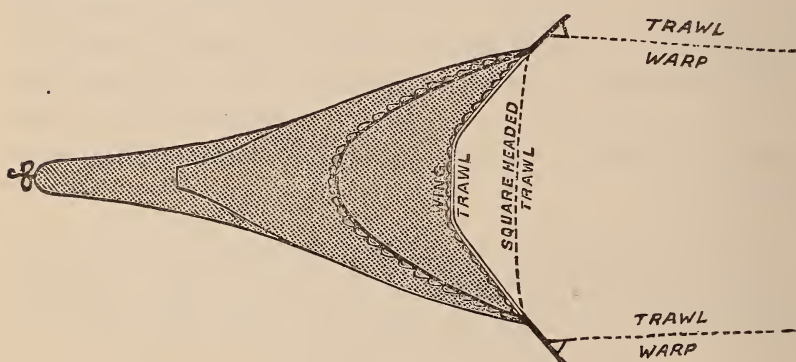
Swordfish had the call at the wharf this morning, as there is a demand for the fish at this season. There were six trips in, but nearly all the fish were only of average weight, the largest being not over 400 pounds. The total catch was 235 fish.

The season closed early in October. At that time the fish have generally left the grounds where they are found in summer to migrate farther south, besides which, swordfish can be caught only during fine weather, and the frequent storms of autumn make this fishery impracticable.

Space does not permit the discussion of many interesting incidents that have occurred in connection with this fishery. All that can be done is to note the leading commercial facts.

A branch of the market fishery that has heretofore gone unnoticed is the beam trawl fishery for flounders at Cape Cod. This industry was begun in a modest way ten or a dozen years ago, as a result of the publication by the writer of a treatise

on beam trawling in Europe.* At first it was carried on with sail boats, and in that way it was continued for years. Recently it developed into larger proportions, and now we are informed that the fishery employs about 30 schooners and 120 men, besides smaller craft, among which steam or naphtha launches may be included. Some of the schooners engaged in this fishery are as large as 60 or 70 tons, and the writer has personally seen one that was about 40 tons. It may incidentally be remarked that no rig, perhaps, is more unsuitable for beam trawling than that of the schooner. However, this is not apparently of consequence at this time, for it is fair to assume that power-driven craft will soon supersede sailing vessels in this fishery. Indeed, we are informed that some of the launches, which are used at other times for the management of pound nets or weirs, have been utilized for beam trawling in winter.



Short-winged trawl, with otters and trawl warps attached.

There is a strong probability that a material change may soon be made in the trawl net fishery, both in the apparatus employed and in the motive power for operating it. In recent years the otter trawl has superseded the beam trawl in Europe, and steamers have taken the place of sailing craft. The change has been vastly advantageous to the market fishery. Fleets of iron steamers of great value and of wonderful productiveness have been built, and net trawling has assumed an importance

* "The Beam Trawl Fishery of Great Britain, with Notes on Beam Trawling in Other European Countries," etc., by J. W. Collins. Washington: Government Printing Office, 1889.

never before known. In the single port of Grimsby the steam fishing fleet has grown in twenty years, from 1882, when 2 iron steamers were built, to the close of 1902, to 473 iron and steel vessels, having a value of at least \$11,825,000. So completely have they taken the place of sailing vessels that only 41 of the latter are left of a fleet that numbered about 800 sail two decades ago. The reason is found in the fact that one steamer is said to have the productive power of five sailing vessels, besides which, she can go farther afield for fish and can land her catch in better order, thereby enhancing the demand for the product and increasing the trade.

Whether Boston or Gloucester will ever emulate Grimsby in the employment of a steam fishing fleet to supply fresh ocean fish remains to be seen; but that there are many reasons why steam trawling may prove successful is evident to one thoroughly conversant with our deep sea fisheries. Following are some of them:—

(1) At no period of American history has the bait question been more troublesome than in 1903. Such a scarcity of bait may not often occur, but the use of a trawl net entirely eliminates the question of bait supply.

(2) In addition to various species of flat fishes, including the halibut, the European markets are chiefly supplied with haddock, cod and other bottom-feeding free-swimming species taken in the otter trawl. There seems to be no reason why similar results cannot be secured here.

(3) A power-driven craft can use two otter trawls, instead of a single beam trawl, as now operated by sailing vessels; and, inasmuch as one trawl can thus be put down as soon as the other is up, much time is saved and the catch is largely increased.

(4) It may be found practicable to prosecute a profitable fishery at times when the dogfish are so abundant that fishing with baited hooks is impracticable, and vessels using trawl lines are driven from the banks.

(5) It is feasible to fish with a net trawl in any weather except the fiercest gales, consequently time is seldom lost.

(6) We are informed that the English steamers that fish at Iceland in summer, and formerly carried trawl lines only, have

now abandoned the use of the latter, and rely on the otter trawl for taking halibut and cod.

Whether any or all of these reasons, and many more that can be advanced, will lead to the larger use of the trawl net in our fisheries in the near future, remains to be seen. At any rate, through the enterprise of Capt. L. D. Baker, a native and prominent summer resident of Wellfleet, the otter trawl is being tested in a small way; and there is reason to hope for good results, despite the inexperience of our fishermen in handling such an apparatus or in building and rigging the otters, upon the proper working of which the success of the trawl depends. We shall watch this venture with much interest, and already we have given considerable personal attention to it; for, although it is not an experiment in the sense that this method of fishing has been untried, it is, nevertheless, new to our fishermen, and those most expert in certain forms of fishery to which they may be accustomed are liable to fail utterly at first in attempting methods new to them.

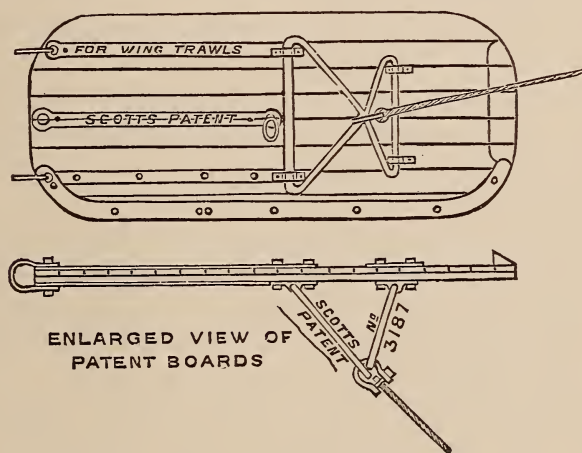
The numerous naphtha dories at Provincetown are usually employed in the winter cod fishery at the time the flounder fishery is being prosecuted, hence there is little chance that they will enter the latter industry. It is possible, however, that power-driven boats may be built for this fishery, or such craft may go to Cape Cod to engage in it if they cannot do as well at or near home. The possibility of steam vessels of considerable size attempting trawl net fishery in the open sea on the outer banks is not so remote as it might appear to be. Because of this, the chairman spent two days in trying to instruct the crew of the oyster dredger "Cultivator" of Wellfleet how to use an otter trawl that had been made for her. The weather was inclement, and unfortunately the otters were too heavily weighted and not properly rigged. For this reason nothing was accomplished the first day. It took a large part of the second day to reduce the weights on the otters and to temporarily rig the bridles so that they would work more satisfactorily. After that the trawl appeared to work well, and the brief trials gave good results in the catch of fish.

The "Cultivator" is a broad launch, about 50 feet long, with a naphtha engine of 25 horse-power. She seems well adapted

to the purpose of trying the otter trawl off Wellfleet and Provincetown.

As soon as circumstances permit, we expect to give further personal attention to this matter. In the mean time, we have, in response to our request, received from Mr. O. T. Olsen of Grimsby, Eng., the following directions for using the otter trawl, these having been specially prepared for us by an experienced smack master, by Mr. Olsen's request, as there is nothing published on this subject in Great Britain, so far as known.

This matter of properly managing an otter trawl is of such consequence that we venture to publish the instructions we have received, and also illustrations of an otter trawl and of



Scott's patent otter or wing board: front and sectional views.

Scott's patent otters or trawl boards. The instructions have been slightly revised, and we hope they may prove useful and valuable to our fishermen.

In Grimsby two flexible steel wire warps are used on a steamer operating otter trawls, and two steam drums or winches — one for each warp — to heave them in. When rigging trawling gear, great care is required in determining the exact length of both warps.

Each warp is made up in lengths of 20, 25 or 30 fathoms, and these sections are shackled together, each end having an eye splice and thimble to receive a shackle. The shackles serve

as marks to determine the length of the warp that has run out, — a very important matter, and possibly the most important in shooting a trawl, for the warps must be veered out evenly to avoid fouling the trawl; therefore, if it is found that a shackle on one warp has run out before the other, that warp must be checked until the hawsers are “levelled up.”

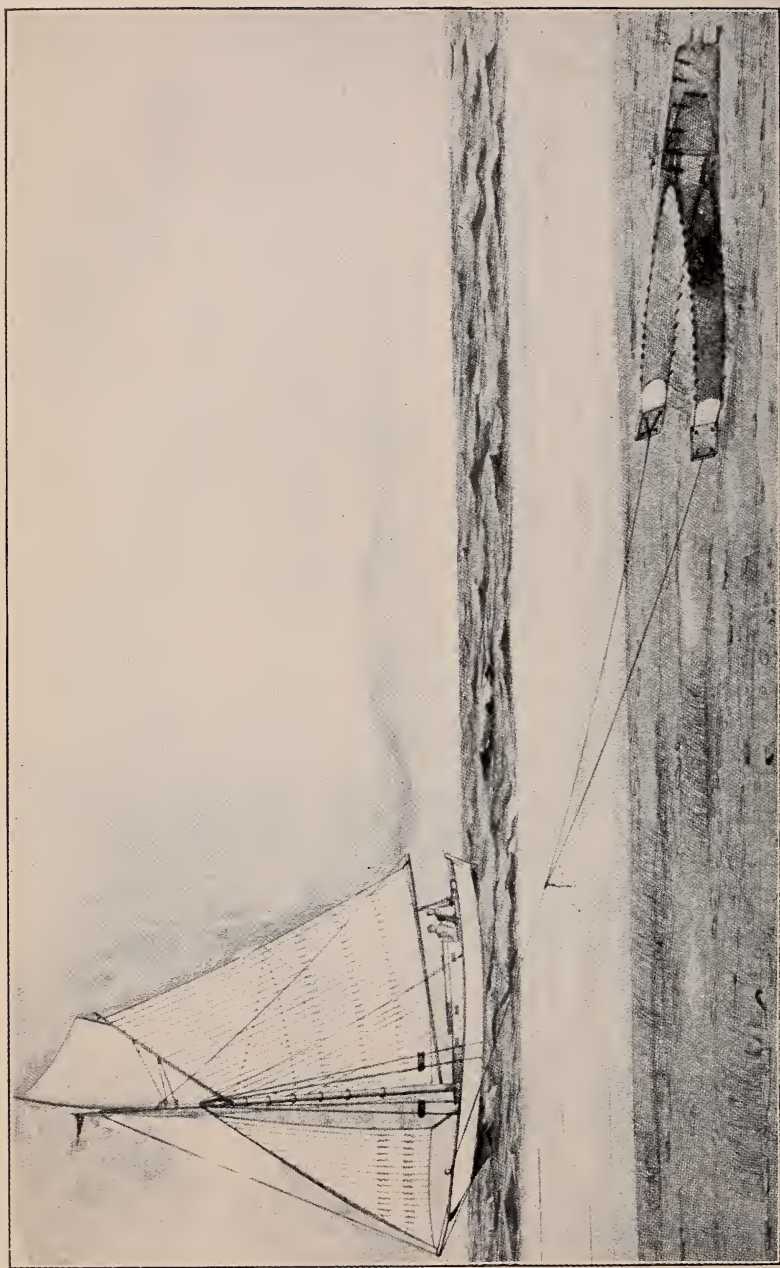
With these leading facts in mind, the act of shooting a trawl is as follows: —

With engines stopped and ship laid dead, proceed to pay away the trawl over the weather side, taking care not to pay away too smartly, but to allow it time to sink, as throwing it out too quickly is often the cause of a fouled net.

One of the best methods of doing this is to pay over the fore and after wings first, till you come to the quarters, — the sections of the body of the net next the wings, — then put over the cod end, the extreme end of the net bag or trawl, followed by the belly and baitings, till the net comes tight to the bosom of the ground rope; then lift the ground rope on to the rail and drop it over the side, when, as a rule, your trawl will be found to flow out quite clear.

In the event of the trawl being new and light, you will find it an excellent plan to weight the cod end with an old fire bar, or something else of no value, fastened to the cod line with a single part of twine, so that it will break adrift when on the bottom, and will not retard the towing of the net.

With the trawl away clear and the quarter ropes securely fastened, each man should take up his respective position, which in a Grimsby trawler is generally as follows: captain on the bridge; mate and No. 1 deck hand attend the winch; third hand at after derrick; No. 2 deck hand at fore derrick; trimmer amidship, ready for the messenger, which is a wire hawser that is long enough to reach from the winch to the stern of the vessel, around the after derrick or gallows, — also called a davit, — thence outside the rigging to the fore derrick. The messenger is passed over the after trawl warp and taken forward, where the stout hook at its end is put over the forward warp, down which it is allowed to slide. Meantime the winch is started and the messenger is hove in, bringing both warps together on the quarter, when a strong slip chain is



A DANISH BOAT TOWING AN OTTER TRAWL. From Report on the Exposition, Bergen, Norway, 1898, by J. W. Collins.

passed around both warps and secured, while the messenger is unhooked.

Setting up taut on the warps, the dogs * should be unhooked, and, everything being in readiness, the order is given to lower away. This is done by lowering away the fore board about 8 or 10 fathoms, and then slacking down the after one well below the propeller. It is a good plan to mark the warps in this position, as it is very difficult to guess the lengths when lowering away at night.

There are several other ways in vogue, notably where the steamer is fitted up with a single-barrelled winch; but, as those are mostly out of date, it is not worth while going into details.

Everything being ready, the engines are started full speed ahead, and as soon as the ship has sufficient headway the order is given to slack away. This is part of the work that requires care and judgment on the part of the men at the winch, for, if the warps are not run out evenly, or as near so as possible, then the error is sure to result in fouled gear.

The best and surest way is to watch for the marks or lengths of warps as they are running out, and check up the one which has run out fastest, so as to level them at each mark or length; they cannot then get very much out of line.

During the time the warps are running out, the man at the after part of the ship will have passed the hook end of the messenger out around the after side of the after derrick, then over the top of the after warp and into the hands of the trimmer, who will take it along the deck (always being very careful to keep the bight of it inboard) and hand it over to the man forward. The trimmer then goes aft abreast of the engine room skylight, and stands by for the word of command to throw the bight of the messenger over the rail and overboard, so that it will go clear of the ship and screw.

When sufficient warp has been run out, breaks are screwed down, and the order is given to hook the messenger over the fore warp and let go, when, by its own weight and the ship's headway, it runs along aft on the fore warp. The trimmer then flings the bight overboard, while the man aft hauls in

* A dog is an iron claw with two stout teeth that is shackled to an eye bolt in the deck and is used for slipping over a chain as a stopper.

the slack as much as possible and places it in the hawser roller aft; the trimmer, assisted by the deck hand No. 1, puts turns round the end of the winch barrel, and the mate proceeds to heave away on it. As the fore warp is being hove up aft, the hook of the messenger picks up the after warp also, thus bringing both warps together up to the after quarter.

Having hove the warps up within a foot of the roller, a patent slip hook or block is put around them, attached to a strong chain; the messenger is then slacked up and unhooked, and then the vessel proceeds to tow along. While the snatch block just referred to holds the two towing hawsers together at one side of the stern of a steamer, the strain of towing comes on two heavy swivel blocks, of which there is one hanging beneath the centre of the arch of each derrick.* Each of the steel-wire towing hawsers passes over the block, thence around or through a guide or fairleader to the drum of the steam winch, which heaves in or veers out the hawser, as circumstances demand.

In the management of a trawl the so-called quarter ropes play an important part. These are two ropes which are used to assist in getting in the net. Each of the ropes is bent to the footrope at the quarter of the net, and leads to its respective otter board, where it is made fast so that it will tow loosely. After the trawl has been hove up alongside of the vessel the quarter ropes are cast off from the boards and led to the winch, when they are hove in evenly until the bosom of the footrope is over the rail. This saves a lot of hard labor for the crew in getting the trawl on board; but the rest of the net must be gathered in by hand until the "cod end," where the fish are, is at the surface of the sea, when a strap is passed around it, and it is hove on board with the fish tackle. The lower end of the trawl is then unloosened and the fish fall on deck.

Although the fresh halibut fishery is still actively prosecuted

* A derrick is a stout iron device, shaped like an inverted U; it is strongly bolted to the vessel's deck near the rail, but far enough from it for the otter board to easily go between it and the rail; it is commonly called a gallows by the fishermen, but is also spoken of as a davit. There are four of these derricks, two on each side, one being well aft on each quarter and one forward. They are high enough from the deck so that the warp running through the block at the top of a derrick will lift an otter board clear above the rail, so that the board can be readily swung in or out, as circumstances demand.

in the North Atlantic, it is evident to one who is observant, that, notwithstanding the bravery and hardihood with which it is conducted, it has fallen behind in the competition with the Pacific halibut industry, and now holds second place. How much longer it may be profitably engaged in no one can foresee with certainty; but the reports that have come to us indicate a gradual decline of the halibut on the Atlantic fishing grounds that are sufficiently near the great markets of Gloucester and Boston to make it feasible for sailing vessels to seek fares of fresh halibut on them. At times they go beyond Newfoundland, on grounds that lie east and north-east of it, and even off the ice-beleaguered coast of Labrador, far up toward Hudson's Bay; but this is the limit for fresh halibut fishing, which can be prosecuted there only for a brief time in summer, when all the conditions are most favorable. From the nearer grounds, which are the chief reliance for the greater part of the year, small fares of halibut mixed with more or less cod are the rule.

One of the largest fares reported for the year was that of the schooner "Anglo Saxon," taken in latitude $55^{\circ} 20'$ in 200 fathoms of water off the Labrador coast. She was reported to have arrived with 53,000 pounds of halibut on the evening of September 9.

The salt halibut fishermen, who pushed their way into the icy seas of the far north, met with fair success, and some of them, because of the high prices, secured large stocks.

The schooner "Puritan" of Gloucester arrived home about the last of September, and was reported to have landed a fare of 140,000 pounds of fitched halibut, which gave her a stock of \$11,172; her crew shared \$333.64 each.

The schooner "George Parker" landed 184,400 pounds of fitched halibut, and stocked \$15,185; the crew shared \$388.72 each. With one exception this is claimed to be the largest stock ever made from a single fare in the north Atlantic salt halibut fishery.

These fares were obtained in Davis Strait, off the west coast of Greenland, where a number of vessels fished, some going far north. One of them, the "Oregon," was reported to have caught a halibut in 380 fathoms that was estimated to weigh upward of 500 pounds. Several schooners that went to Ice-

land at first subsequently went to Greenland because the fishing at Iceland was poor.

Prolific as the Pacific halibut fishery has been in other years, so far as the Massachusetts-owned vessels are concerned, it seems to have gone beyond established records this year, in some particulars at least.

A correspondent of the Gloucester "Times" wrote to that paper a letter which was published on April 24, 1903. He avers that the Boston steamer "New England" landed a fare of fresh halibut on April 10 that weighed 145,500 pounds, exclusive of heads, which, according to the rule adopted by halibut buyers in New England, would weigh 20,370 pounds. This would make her fare aggregate 165,870 pounds if weighed with heads on, as is generally customary; they would weigh upwards of 190,000 pounds as they came from the water. The startlingly remarkable thing about this great catch of halibut is that it was taken in one day. The correspondent wrote:—

The trip was caught on April 8, off Goschen Island, about 400 miles north of Vancouver, and was taken by 12 dories, fishing 50 fathom lines to each dory. It was a fine, calm day, the quantity being so great that some 40,000 [pounds] were stowed in the hold without being dressed, and the balance taken on deck. When the deck load was dressed and iced, the fish stowed in the hold were hoisted out and dressed.

It is difficult to comprehend the possibility of a single crew catching nearly 100 tons of fish in one day. Nothing approximating such a catch in a similar time has come to our knowledge from any part of the world. The nearest approach to it that we have known of occurred in the same fishery this year, when the Boston fishing steamer "Kingfisher" caught more than 100,000 pounds of halibut in one day, and, as a result of less than three days' fishing, she was reported to have landed a cargo of more than 250,000 pounds of halibut. This is the record to date, and probably will remain so for a long time, unless vessels of greater capacity are employed, and that is not likely.

On April 22 the "New England" was reported to have arrived with a second fare of 135,000 pounds of halibut that

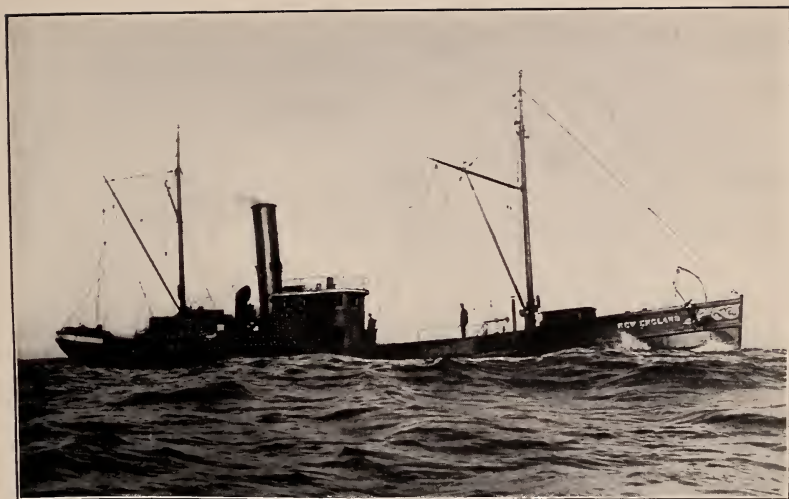


Fig. 1. Fishing Steamer "New England," with Fare of Halibut on Board.



Fig. 2. Halibut Fishing Steamer "Kingfisher."

were caught in a single day, and she might have equalled her former catch except for a squall that interfered materially with fishing.

The results of this fishery for halibut off the north-west coast of America are of a character that borders on the marvellous. For instance, it is stated by competent authority that the year's catch of the little fleet of three steamers owned in this State has been about eight and a half million pounds, — a truly wonderful record.

The Boston "Globe" of Sept. 26, 1903, in an article dealing with the Pacific halibut fishery, said, among other things: —

The amount of fish brought here for distribution is enormous. Averaging a car a day and 30,000 pounds to a car, there are in the neighborhood of 9,000,000 pounds of halibut brought here annually from the Pacific Ocean. This will bring at wholesale an average of over 10 cents a pound, or in gross the business done in this fish alone is nearly \$1,000,000 a year.

The company that owns the "New England" and "Kingfisher" added another steamer to the fleet during this year, which began fishing the last week of 1903. This vessel, we understand, is a wooden steamer that was purchased and fitted up for the trade, but of course is not so suitable for the halibut fishery as the iron steamers built expressly for the business. Indeed, it is not easy to find a steamer which will answer the purpose well; and one who has visited the principal fishing ports of England informs us that the British fishing steamers are wholly unsuitable for fishing off the north-west coast; they are too small, and are not suitable in other particulars, because of having been built for a fishery so entirely different from that under discussion. Presumably for this reason a Massachusetts corporation is reputed to be building a steamer which will be launched before this year closes.

There were only three Massachusetts steamers engaged in the halibut fishery on the north-west coast during 1903, but the fleet is likely to number five vessels in 1904.

The work of the three boats running in 1903 has been remarkable, and for two of them it has been phenomenal. It has been estimated, by one in a position to know, — with

accurate knowledge of the catch of two of the vessels, — that the three steamers landed an aggregate of 8,450,000 pounds of halibut during the year, this weight being for fish eviscerated and headless. In order, however, that a fair comparison may be made with halibut landed from Atlantic coast vessels, it is necessary to add the weight of the heads, since the Atlantic halibut are never decapitated until after they are weighed, and all weights given for them include the heads. On this basis, then, the three steamers landed 9,633,000 pounds of dressed fish, and two of them averaged 3,819,000 pounds each. It is certainly wonderful that one vessel should secure a catch equalling that of many schooners fishing in the Atlantic.

We learn from the same authority that the largest fare landed by any steamer was 230,000 pounds of headless, eviscerated halibut. This amount of fish would equal 262,200 pounds as landed from a halibut catcher in the Atlantic fishery.

No accurate figures of the crews' share for 1903 are available, but the men probably earned as much as in 1902, when the 24 sharesmen on the "New England" received an aggregate of \$41,989.79, or an average for each man of \$1,749.57. The crew of each dory, however, receives pay according to the halibut caught by that particular boat, so that two men in each case have the same share. The two men in the high line dory on the "New England" each earned about \$2,000 for 1902.

It is not remarkable, in view of these facts, that the best fishermen eagerly seek berths on these vessels, for in no other fishery has the share been paralleled.

It may be noted in passing, that, whereas it was customary at the beginning of this fishery to prosecute it only for about seven or eight months in a year, — from fall to spring, — it is now continued throughout the year, with only such intermissions as may be necessary for repairs, painting, etc.

The fall herring fishing along the coast has been pursued with the usual ardor. The principal change in it has been the utilization of an increased number of large dories propelled by naphtha engines and specially adapted to this fishery. These dories are usually more than 30 feet long; the majority recently built range from 33 to 35 feet in length or more. They generally have a small trunk cabin aft, wherein the crew can

sleep and cook when necessary, and where also the engine is located. The dory is decked forward and aft, and a strip of the deck about a foot wide runs along on each side of the fish room, around which are vertical washboards 4 to 6 inches high. The engine is commonly a single cylinder type, of about 5 to 6 horse-power, but may sometimes be more powerful.

A boat of such a type is a vast improvement over the old-fashioned rowing dory, especially for torching herring; and her larger capacity and facility of management makes practicable increased catches and prompt delivery of the herring at the markets. Such crafts are also efficient in other branches of the fishery.

It is also true, it appears, that the scope of the autumn herring fishery has been enlarged somewhat by the wide adoption of the power dories; since, because of their size and the facility with which they can run around, also the fact that they have power to safely face heavy off-shore winds that may spring up suddenly, fishing can now be safely and successfully prosecuted on grounds not heretofore resorted to, or at least not fished on to any extent. Thus it is reported that the power dories have met with success.

Herring fishing in the fall of 1903 was prosecuted along the so-called south shore, that stretches away to the southward of Boston toward Plymouth and Sandwich. Along this shore the harbors are infrequent and sometimes difficult of access when the wind is blowing on the land, and the in-running waves break heavily at the entrances of barred, narrow outlets of creeks or rivers, which serve as boat harbors in some places. However, it has been feasible to meet these obstacles with the swift, buoyant power dories, and good catches are reported from off Sandwich, Marshfield and other points where herring occur, but where fishing for them in row boats was dangerous.

But, while this shore fishery serves its purpose in supplying bait to the market fleet, and it also furnishes more or less food, the salt herring fishery at the north-west coast of Newfoundland, which employs a fleet of the finest of our fishing vessels, is a branch of the fish trade of large and growing importance. In recent years this trade has developed from comparative insignif-

nificance until now the cured product as it goes to the consumer probably sells for not less than half a million dollars. It has been stated that a fleet of 42 vessels engaged in this fishery in the winter of 1902-03; but the fact that some of these were frozen in for all winter, and consequently made "bad voyages," may account for the fact that a less number ventured to brave the dangers of such a trip in the fall of 1903. Reports received early in December were to the effect that the vessels engaged in the trade had either arrived home with full cargoes, ranging from 1,000 to 2,000 barrels, or were loaded and on their homeward passages. Nevertheless, so great is the demand for "bloaters" made from these fall herring from Newfoundland, that there was apprehension of a shortage in the supply.

The following notes in reference to the salt herring industry are extracted from an article that appeared in the "Cape Ann News," Nov. 18, 1903:—

The introduction of smoked bloaters in the market, which commenced a few years ago, has had the effect of increasing the demand throughout the country.

The article produced from the herring at Newfoundland, and especially on the west coast, is not equalled by any in the world. . . . The attractive manner in which it is put up with utmost care is, in itself, an incentive to consumers to use double the quantity heretofore disposed of.

Dealers in this commodity are receiving unlimited orders, which it will be impossible for them to fill, owing to the short supply. If every vessel now at Newfoundland is fortunate in securing a full load, it will not be one-half of what will be required. To say that this business has grown by leaps and bounds is putting it mildly. The herring consumers, and especially consumers of this delectable article of food, will have it, if it can be procured, at any price.

It is fair to assume that the profitable returns secured by the vessels which engaged in this trade near the close of 1903 will have a tendency to induce a larger fleet to enter the business another year, when the hardship and loss that were experienced in the winter of 1902-03, on account of some of the vessels remaining too long at the Bay of Islands and being frozen in until spring, will be less of a dread than now.

It is regrettable that the herring season at the Bay of Islands is so short and so full of danger and hardship, and especially that a vessel which may be detained a few hours longer than she ought to stay may be as tightly frozen in harbor, and held there until spring is well advanced, as if she had been caught in the grip of the frost king of the far north. A mild period of weather may suddenly be followed by a fierce northerly gale and biting frost, and before it is possible to get to sea again a wild, chilling blast drives in against the land and congeals the sea, the surface becomes thick and slushy-like, but soon is more rigid; and those thus caught know that human effort is unavailing to change the result, for the helpless vessels thus imprisoned must lie in icy fetters until they are released the next spring.

As the best season for the big, fat herring is late in the year, — in November and December, — the most strenuous effort is made to get a cargo on board and sail the vessel away into the open ocean on the homeward passage.

Nothing can exceed the rush and drive of the work when herring are abundant. The fish, which are piled on deck from the boats as fast as they can be thrown over the vessel's side, are hastily tumbled into the hold, salted and stowed in bulk with the greatest expedition, layer following layer, as fast as possible, while the sleep-hungered men toil on wearily through the long night, adding to the pile below and wading around knee-deep as best they can in a mass of slippery, yielding fish, that are scarcely yet dead, the silvery scales of which cover vessel, spars and fishermen in a sheen that glows with a dull brilliancy in the glare of lamps, but passes unnoticed in the struggle to complete the lading and get away to sea.

As an instance of what may be done, the steamer "Alice M. Jacobs" made a trip to the Bay of Islands in the fall of 1903, and returned home in eighteen days with a cargo of about 2,000 barrels of herring in bulk. When it is stated that she had to sail a total of some 1,200 or 1,400 miles of rough, wintry sea, it will be seen that the time occupied in getting on board that vast bulk of fish and curing it was limited indeed.

Practically all the herring brought from the Bay of Islands

are salted in bulk; very few are carefully cured in barrels. The rush to get loaded and sail away for home leaves little time for the careful cure of pickled herring; and so far the demand for bulk herring for smoking has caused quantity to take precedence of quality, especially as a demand for American pickle-cured herring has not yet been developed as it ought to have been. What has been accomplished in the bloater trade in a short time indicates unmistakably what may be done in the pickled herring business, if the proper methods are adopted. If we can increase the former, — and that seems perfectly feasible, — and at the same time build up a traffic in pickled herring that should be worth \$1,000,000, the herring fishery would assume the importance that it is entitled to. There is reason for believing it is entirely practicable to have a herring industry here in Massachusetts that will yield an income approximating \$1,500,000, — an industry that would be more valuable than any other fishery now is; and the fact that about one-third of this has already been attained is reason for the hope that the full measure will be secured within a reasonable time.

As we have previously stated, the American market for pickled herring has been occupied by foreign goods, and American cured fish cannot force out foreign brands without a long, hard struggle. But no effort should be spared by our fishermen to get control of the market; the fight for it should be waged persistently and unflinchingly, for once the battle is won the field offers possibilities second to none. Even in the turmoil and haste of loading a cargo of bulk herring at Bay of Islands, it seems possible to cure a few barrels properly of packed pickled herring. In this way they could gradually be worked on to the market, until confidence was established in the goods. If it can be accomplished, the question of supply would then be the chief matter of consideration. And if the day ever comes that American caught herring can sell for \$10 to \$14 per barrel, as European herring do, why will it not pay to fish for them in summer, either off our own shores, where they are large and fat, or in the harbors of Labrador, where they were sought by our vessels forty or fifty years ago?

We understand that Capt. Solomon Jacobs, who commanded the steamer "Alice M. Jacobs," was particular this fall to use only the finest quality of salt, consequently his cargo of fish was exceptionally clean, hard and white, — so superior, in fact, that it is surmised his example, which has often been potent for the benefit of the fisheries in various directions, will be followed by others in the future. He has been quoted as saying : —

The people of New England appear to me to look upon herring as worthy of no consideration, and so put them up for shipment in a hap-hazard sort of a way.

While at Bay of Islands I saw the way herring were put up for the Canadian trade by merchants down there, which method our people would do well to copy. One consignment of 2,000 barrels for Canada was cured in a most practical and marketable form, and commanded a high price.

The people in western Canada, who have lately immigrated to that section of the Dominion from northern Europe, know what good herring are, will have none other, and are willing to pay a good price for the same.*

Statements like these from such a well-known veteran of the fisheries have an important significance, since they are liable to have a large influence in securing the action we have urged for several years. And it can be said that those who mostly consume herring in the United States are like those of western Canada, to the extent that they "know what good herring are, and will have no other;" also that they "are willing to pay a good price" for them. This is a fact that cannot be considered too seriously, for the market is an immense one, and one that *pays well*.

It has been stated that never before in the history of the herring fishery have the vessels all loaded and got away for home so early in the season as this year; for it was anticipated all would have arrived or been on the way before the close of November. This is said to be due to the increased number of fishermen who engage in the capture of herring, and also to the fact that they are better equipped than ever before, and

* Gloucester "Times," Jan. 1, 1903.

have the fishery reduced to "a science." As early as November 21 the "Cape Ann News" reported the "whole fleet loaded and on the way home." This announcement is, however, believed to have been somewhat premature, since we are informed that all of the herring vessels had not arrived three weeks later, although the first arrivals, bringing 5,760 barrels, were noted as early as November 21.

The schooner "Senator Gardner" of Gloucester went to the north-east coast of Newfoundland after a cargo of salt herring. Herring were scarce at Notre Dame Bay, at the extreme north-eastern point of the island, and she then went to White Bay, where there were a few fishermen. She secured about half a cargo there of fine, large, fat herring, but the near approach of winter would not admit of a longer stay. She then went to Bay of Islands and quickly completed her fare. This venturesome innovation in the pursuit of salt herring is interesting, and may ultimately lead to other voyages to that part of the Newfoundland coast, where a herring fishery may be established if the local fishermen once learn that they can sell their catch.

The recent decision of the United States Board of General Appraisers, — announced in the press Oct. 21, 1903, — whereby it is held that cargoes of herring landed from American vessels are duty free, notwithstanding they are "caught with the assistance of men, boats and gear hired for the purpose in the Bay of Islands," is a very important one, and, if it stands, will have a tendency to build up this trade by the employment of vessels of this State. This decision related to the cargo of the schooner "A. E. Whyland," that was landed in 1902, and upon which a duty was at first assessed at Boston.

The fishery season of 1903 is interesting because of the great abundance of menhaden in our waters, — an indication that their absence at times heretofore was due to those unexplainable terms of periodicity that so frequently affect the presence of migratory fish, especially those of the herring family. Large catches by the steamers engaged in this industry have been reported from the regions north of Cape Cod, and in some instances these have been made close in shore. We are informed that in one day during September 4,500 barrels

of menhaden were taken off Long Island head, in Boston harbor.

The whale fishery has been about as usual. The vessels fishing in the Arctic, north of Behring Sea, have experienced varying fortunes, some having made good catches, but the majority having met with only fair or poor success. The whaling steamer "Gay Head" was reported to have arrived at San Francisco late in October, with a valuable cargo taken in the far north. The steamer "Alexander" arrived at the same port about November 9, with a catch of 12,000 pounds of whalebone, estimated to have a value of \$75,000. On the other hand, the steam bark "William Baylies" of New Bedford, one of the Arctic fleet, was reported as having taken no whales, and to have made a "losing voyage" to the extent of \$20,000.

The Atlantic fishery for sperm whales appears to have been more successful than for some years, with the possible exception of 1902.

Several dead whales have drifted ashore on various parts of the Massachusetts coast, and in some cases the stench arising from the decaying carcasses has proved a severe annoyance to local residents. We are not informed that their death was probably due to the prosecution of whaling operations off our coasts, and it is possible they may have been wounded a long distance off, but still have been able to make their way here before dying.

It is a fact well known to all students of fisheries that the supply of caviar made from the roes of the sturgeon is only a fraction of what the market demands; consequently, as has been pointed out by the writer, in his report on the Bergen exhibition of 1898, a large percentage of the caviar made in Russia is prepared from the roes of the pike perch, Caspian roach and the bream, and is known as scaled fish caviar. Indeed, the roes of many species of fish are utilized for the manufacture of caviar. In Norway the cod roe is used for the same purpose. This is subjected to slight fermentation, and is then packed "in tightly sealed one-pound glass jars."

It has occurred to us to suggest the use of the halibut roe for making caviar, both because the eggs are nearly the size of

those of the sturgeon, and because the ovary sacks are so large. At certain seasons, particularly in the fall and early winter, the roes are generally in good condition to use for the preparation of caviar, and if they are properly handled no doubt good results might be secured. The excessive demand for caviar and the high price paid for it may be sufficient reasons to make it worth while to utilize a product now thrown away, for, to the extent that we can make waste products valuable, the industry is benefited.

INSPECTION OF FISH.

The official inspection of fish has been utterly abandoned this year by the single packer who was the only one to inspect fish in 1902, and, for the first time in a century, the annual record of "mackerel inspection in Massachusetts" will not appear. We are informed that not a purchaser of mackerel or of other fish has requested that they should be officially inspected; and, inasmuch as there is no legal obligation to inspect them unless a request is made by the buyer, there was no reason why the dealers should incur the expense and trouble incident to inspection that was not required.

Whether the omission of inspection this year indicates that the State guarantee of fish is to be abandoned altogether or not, remains to be seen. The outlook, however, is apparently in favor of the non-resumption of fish inspection in the immediate future, unless some "pure food" law of the federal government makes necessary an official guarantee of quality that must stand unchanged in every State. Something of that kind may come in the not distant future, for the mutual benefit of producer and consumer. But so long as the State inspection has no significance outside of State boundaries, and can be changed or discarded at will, there appears to be little if any advantage in official care of fish or other food products.

GAME.

How the Hunting of Game may benefit the State. — It requires no carefully prepared statement to convince one who has ever engaged in hunting of the physical benefit the pursuit of game will confer on a person who participates in it; nor is it necessary to seek far to find ardent and zealous advocates of the

theory of the public benefit of hunting. This feeling is not confined to those who have been enthusiastic sportsmen from boyhood, and whose love for the chase, the sweet fragrance of pines or balsam-scented firs has grown with their growth and become intensified with passing years; but often it is found most highly developed in those who, as a last resort, have "taken to the woods" in an almost hopeless endeavor to regain lost health, which pills and plasters had failed to restore. After a few weeks' contact with nature in the wilds, with gun and guide as companions, they have found strength and an enjoyment of and zest in life not previously felt for a long time. When this occurs, as it often does, is it wonderful that he who feels he has gained a new hold on life, whose theretofore sluggish blood bounds through his veins with renewed impulse, whose eyes glisten and whose cheeks glow with the bloom of regained health, should become an ardent convert to the doctrine that it is both desirable and necessary for man to occasionally get near to nature's heart, and to gratify the inborn instinct to hunt, — that wonderful natural desire to pursue and kill wild birds and beasts that was one of the most pronounced in primitive man, and which has come down to us through long ages as an inheritance in almost undiminished force? We have met those who have had such experiences, and some of whom have frankly declared that at one time they had believed the fondness for hunting expressed by some persons was simply a fad, — one of those half-silly hallucinations of the human mind that sometimes affects one as a sort of harmless lunacy, but which is entitled to no special consideration on the part of more sensible people, beyond perhaps a polite endurance of their talk, until it is possible to get with others who have not been similarly afflicted. But the change in those who fortunately have had their health restored by hunting is usually radical, and thereafter they are the most pronounced advocates of this form of recreation, and most condemnatory of the views held by them before knowing the benefits to be derived from such amusement.

The very fact that so many go into the wilds of Maine and Canada to hunt each recurring season is evidence enough that, aside from the enjoyment they derive from the sport, they feel

that their physical condition is improved, and they are better fitted to carry on their life work for the rest of the year. The fact that one is willing to temporarily lay aside weighty business cares that need his attention, leave office and the comforts of home behind, and go off into the heart of a wilderness to rough it for weeks, beside paying a good, round sum for the privilege of tramping through unbroken, snow-covered wood roads, is seemingly sufficient evidence that there is a physical exhilaration in hunting that impresses its devotees in a manner to make them thorough believers in the beneficial effect upon their health.

It is not, however, practicable for all who desire to enjoy this sport to get away for weeks to hunt big game, while the attendant expenditures of going into northern Maine or into the distant wilds of Canada might prove a serious drain upon the financial resources of many whose salaries are limited, but who, of all men, most need the renewed vigor that open air exercise brings. One of these recently remarked to the writer: "I cannot get away from my office for more than a day or two at a time, but by care I can go often. It would not be practicable for me to go to Maine or New Brunswick; my hunting must be near home. If I can get out and shoot a fair lot of birds or other game in some cover that I can reach in an hour or two after leaving the city, there is ample inducement for me to hunt, and take the active, out-of-door tramps that fill my lungs with God's pure air, and benefit me so much that I am better fitted for days thereafter to carry on my work. I really long for the open season to come, and, while I rarely can get out for more than a day at a time, the frequent repetition of these outings during the hunting season restores my vigor to such a degree that I can go on for the remaining ten months of the year, and do better work than otherwise would be possible. But when the hunting season is near again, the longing for the woods comes on me, and I am as eager for the first day's hunt as a boy is to be let out of school."

It would be easy to multiply individual statements like this, but they would simply be a repetition of the same experience, and all would go to emphasize the fact that the effort to pro-

vide recreation of this order for the hundreds and thousands of our citizens who enjoy hunting, and cannot get far away from home, is really a very important work of the State government. To the extent that, through protection or otherwise, the means can be supplied to offer fair inducement to hunt within our borders, we shall not only be furnishing the opportunity for healthful and invigorating recreation for our citizens near their homes, but we shall retain within our borders considerable sums of money that otherwise might be expended elsewhere. Many are now fully contented with hunting small game, such as our covers afford, who otherwise would surely go to the Provinces or into neighboring States if game was unavailable within our own borders.

It is not practicable to present statistics showing the benefits accruing to our citizens through hunting, for this matter is not one that can be very readily reduced to mathematics ; we simply know from general testimony that they are beyond estimation. It is for this reason that we have striven to produce conditions within our own boundaries which, primarily, will enable many who otherwise could not hunt to get out for a greater or less time to near-by covers for shooting, and also to provide sufficient inducement in the way of game to keep within our borders many who might otherwise go somewhere else to spend money, which, in the aggregate, would be no inconsiderable amount. We believe this is a practical benefit to the State, the importance of which is far beyond any estimate that could be placed upon it. Because of the opportunity to hunt, our boys grow up into vigorous manhood, better fitted, perhaps, for the exacting duties required of them in later years in the strenuous effort of developing a great State and nation. The vigor of mature manhood is thus much longer retained, and the wisdom that experience brings is made more efficient. Who will say that the proud position held by Massachusetts in the business, literary and scientific world is not in some measure due to the vigor resulting from the health-giving recreation of hunting?

In previous reports we have suggested that, if we can secure desirable conditions within the limits of our State, the citizens of other States may be attracted within our borders to hunt, as, indeed, they are, and the Commonwealth will thereby

be benefited. It is true that the abnormal scarcity of the partridge this year, due to natural conditions that could not be controlled, made the cover shooting much less attractive than otherwise it would have been; but the sea-coast shooting has seldom been so good in recent years, and this is not only a sport much enjoyed by our citizens, but one which brings to us many non-resident sportsmen, who are attracted here to participate in the pleasures of hunting to be found along our beaches and on the borders of our inland lakes and ponds. In this respect sea and inland waters furnish as powerful a magnet to draw the hunter as they do to invite the angler in those seasons when the latter can indulge his passion for fishing.

Need of Protective Legislation. — During the past four years various desirable and highly important laws for the better protection of game have been enacted; and sportsmen have much occasion for satisfaction with the wisdom of the Legislature in this regard, and the large appreciation shown of the value to the State of throwing legal safeguards around the wild denizens of our covers and coasts, in order that they may be preserved to us as a perennial enjoyment, and transmitted to generations yet to come.

But, while there has been a distinct advance in wise and helpful legislation, the fact remains that many of the laws must necessarily remain partially non-effective until they are vitalized by the enactment of a law giving the right of search, under certain conditions, to those having the responsibility of enforcing the fish and game laws. Any one who is at all familiar with the difficulties attending the enforcement of this class of laws cannot fail to recognize that it is beyond the possibility of human endeavor to fully and satisfactorily enforce them, unless a general right of search is given. Provision of law should also be made whereby it may be possible for officials to get a search warrant in case of need. It seems an anomalous condition of affairs for a commission to be given the grave responsibility of enforcing a certain class of laws for the purpose of securing better protection from the illegal acts of those who are lawless, and then to deny to that department the right and authority which alone will enable it to do what must be done, if the laws are to be as valuable as the public have a right to expect they

should be. At the present time we are officially informed that there is no law on the statute books which gives a right to secure a search warrant for fish and game, however urgent the case may be, or however demoralizing to the cause of protecting fish and game this lack of legal power may prove. The following letter presents clearly the facts in the case:—

Capt. J. W. COLLINS, *Chairman, Fish and Game Commission.*

DEAR SIR:—In reply to your letter of December 5, I advise you that there is no law at present under which a magistrate is authorized to issue warrants for fish or game held in violation of law. Fish and game are not included in the search warrant statute (R. L., c. 217, par. 1), and there has been no special act authorizing the issue of search warrants for that purpose, as in case of intoxicating liquors (R. L., c. 100, par. 12). It is settled that search warrants are to be issued only in cases expressly authorized by law. (See Cooley's Constitutional Limitations, p. 368.)

Very truly yours,

FREDERICK H. NASH, *Assistant Attorney-General.*

The foregoing-described condition should not longer exist. It surely cannot be wise to multiply laws that cannot be enforced, because the State is left helpless for the lack of an act that can give validity to them. To our minds there is no legislation for the protection of fish and game so much needed at the present time as a law which will give the right to search, with or without a warrant. There are many reasons why such a law should be enacted, the strongest of which, perhaps, is the pressing necessity of securing better protection for our insect-eating birds than is now possible.

The destruction of insectivorous birds is going on at a rate that threatens their extermination in the not distant future, or at least their serious decimation, to that degree that they can be of little practical value in checking the depredations of the numerous insect pests, prominent amongst which are the gypsy moth and the brown-tail moth.

For several years, recently, natives of southern European countries and Asia Minor have come to this State in large numbers. There is often a colony of them in the larger cities, and, in cases where extensive industrial operations are being conducted in some of the country districts, as building railroads,

reservoirs, etc., men of this class are often brought together; sometimes there are camps containing hundreds of them.

Wherever they are, these men generally develop a remarkable tendency to hunt when they can get away from their work, — to hunt regardless of law, as a rule; and especially are they noted for killing insectivorous birds. It is true they sometimes catch small birds in traps, or by the use of bird lime, but the usual thing is for them to get possession of a cheap gun, some powder and shot, and then to go into the pastures and covers and shoot at anything that moves, although song and insectivorous birds are the special objects of their pursuit. It is not difficult to imagine the slaughter done by the groups who go out from the large cities, or by those who are temporarily assembled in the country towns; but it is a conservative estimate that, if this destruction goes on much longer, practically unrestricted, the effect upon the numbers of our small birds will be seriously evident.

Occasionally these men are caught in the act of shooting or trapping birds, and are brought into court, perhaps to be fined to the limit of the law if convicted, but more commonly with some other result. But, as the law now stands, one of these men may have all his pockets stuffed with birds, and boldly walk by one authorized to enforce the law against shooting; and the latter, though he suspects the true condition, must stand helpless in the face of one of the most injurious and least excusable violations of the fish and game laws.

It will readily be seen that the chance of actually witnessing a violation of the law by shooting small birds is remote; and when there are so few active salaried deputies, little can be done to repress this illegal work until proper and necessary authority is given to the officers charged with the enforcement of law.

This extensive killing of song and insectivorous birds is a matter of far greater consequence to the State than at first might appear. The farmer and horticulturist are particularly dependent upon the small, insect-eating birds. Except for them, crops would be practically impossible. Competent scientific authority has declared that a country in which the birds have been exterminated would become uninhabitable in

fifty years. The value of birds to the farmer, in the matter of destroying noxious insects, has been forcibly set forth in the annual reports of the Massachusetts department of agriculture. Enough could be quoted on this subject, from those reports and other publications, to make a volume several times larger than this report; and there is good reason why every available statement of fact should be placed before the public at this time, in order that there should no longer be any question as to what is needed. But we will content ourselves with a single extract, which deals chiefly with the birds that destroy the brown-tail moth, that exceedingly objectionable pest, which not only defoliates our fruit and shade trees within a wide radius of the centre of Boston, but becomes nearly an unbearable torment to those who are unfortunate enough to come within the limits it frequents, and are thus subjected to the dreaded "caterpillar itch."

Massachusetts has expended millions of dollars on its metropolitan park system, and hundreds of thousands have been spent in an ineffectual fight to subdue the troublesome moths, which have wrought such havoc in places with foliage and fruit trees, and threaten to extend their devastations still further, unless they can be checked. In view of this public peril, can it be possible that the destruction of insect-eating birds shall be allowed to go on almost unchecked for lack of a law that will save them, and permit their increasing numbers to become powerful allies in this battle for the preservation of the beautiful parks which we cannot justly see become barren wastes without an effort, and also for the preservation of our farming interests throughout the State?

As an instance of what the birds can do to assist in repressing the moths, we venture to quote the following from a recent publication of the agricultural department of the State:—

Birds play an important role in checking the spread of the brown-tail moth. While their attacks are perhaps more conspicuous while the insect is in the moth stage, it is probable that the greatest number of insects are destroyed in the larval form, at which time many species of birds not only consume the caterpillars, but carry them to their young. Armed as these larvæ are with an abundant growth of netting hairs, it would seem that they would prove distasteful morsels

for the birds, and be largely protected from their attacks. This, however, is not the case; the same species of birds that feed on other hairy caterpillars, such as the tussock moth, forest tent caterpillar or gypsy moth, readily adapt themselves to the brown-tail moth caterpillars. Of the birds feeding on the caterpillars, the yellow-billed and black-billed cuckoos and Baltimore oriole are worthy of special mention. They are common visitants to infested trees, feeding particularly on the insects, and carrying them to their young. They arrive in their summer migration when the caterpillars are about two-thirds grown, and make repeated visits to the infested trees, feeding particularly on the masses of insects clustered for molting. As is well known, the cuckoos are formidable enemies of hairy caterpillars. Their services in destroying the common tent caterpillar of the orchard are of highest value, and alone should entitle them to the good-will of the farmer or property owner; and this statement is also true of the Baltimore oriole. Of the other birds which feed on the larvæ, the yellow-throated vireo and blue jay are worthy of special mention.

It is, however, when the moths are emerging that the layman notices more particularly the work of birds in checking the increase of this insect. The white moths leave their cocoons and remain in situations more or less exposed until their wings have developed. As a result of the habit of the caterpillars in spinning their cocoons in a common mass, there will often be a large number of moths within a small area on a fence, house wall or other sheltered locality. The birds soon locate these favored spots, and often consume the moths even before their wings have expanded. In this work of moth destruction the kingbird and some of the flycatchers figure to a limited extent, but the most formidable enemy of the mature moths is the notorious English sparrow. That this bird, whose evil habits in driving out native insectivorous birds are so well known, should show this distinctly beneficial trait, may be a matter of surprise to many students of nature; but the fact remains that the English sparrow, with its numerous progeny, exerts a great and beneficial influence in checking the moth in our thickly settled districts, — places where natural checks are often most deficient.

July 16, 1897, the time when the moths were notably thick at Somerville and Cambridge, Mr. Kirkland observed whole flocks of English sparrows following along the line of fences and carefully searching for the moths, which when found were greedily devoured. The sides of the pickets and even the bottom of the rails were carefully examined by these sharp-eyed moth hunters, and all moths of either sex found were consumed.

The sparrows do not confine their attention to hunting for live

moths, but also act as scavengers in removing from the arc lamps the masses of moths which accumulate in the globes over night. At 10.30 P.M., July 14, 1897, an arc lamp at Malden around which the moths were swarming was from one-fourth to one-third full of the dead bodies of the moths. Wishing to make a count of the number of moths thus destroyed by the lamp, Mr. Kirkland visited it at 5.30 the following morning; but at that hour the sparrows were actively feeding on the moths in the lamp globe, and also carrying them to their young. July 16 other arc lamps were examined at 4.30 A.M., but even at that time the birds had anticipated the observer, and were carrying off the moths in large numbers. At 5.30 the sparrows had emptied the globe of moths, and also consumed the insects on the ground beneath it. It was observed at 4.30 that there were sixteen male and two female moths on the lamp pole, but at 6 A.M. the birds had consumed all of them.

On the afternoon of July 16, at a time when the moths were still emerging, a drive through the worst infested district showed only three brown-tail moths on lamp poles or tree trunks. There were plenty of moths in sheltered places in the trees and under the leaves of rank herbage on the ground, but those in conspicuous places had been destroyed.

Below is given a list of birds known to feed upon the brown-tail moth in any of its stages:—

Yellow-billed cuckoo.
Black-billed cuckoo.
Kingbird.
Blue jay.
Baltimore oriole.
Rose-breasted grosbeak.
Indigo bird.
Scarlet tanager.

Red-eyed vireo.
Yellow-throated vireo.
Black-and-white warbler.
Chestnut-sided warbler.
American redstart.
Chickadee.
American robin.
English sparrow.

It is certainly interesting to the public to learn that so many species of our small birds will destroy the detested and dreaded brown-tail moth, providing, of course, the birds are allowed to live to do the work nature intended them to do, and which is so vitally necessary and important. Even the despised, outlawed English sparrow is doing his share.

So far as other species of insects are concerned, nearly all forms of birds, including game birds, make incessant war upon them. It is well known that no species is more destructive to the potato beetle than the quail,—our common bobwhite;

while the pheasant feeds extensively upon the cut worm and other noxious insects that trouble the farmer; and even the partridge or ruffed grouse is by no means to be despised as an insect eater, although he gets little credit as such from the majority, who think chiefly of him as a target to shoot at, — he really is the king of game birds, — and a most delicious dainty when properly served on a table.

These facts, which could easily be supported by a multitude of evidence drawn from the highest authority, should be sufficient to emphasize the necessity of taking all available means to give reasonable protection to our avifauna; and especially do self-preservation and the protection of our dearest interests point unmistakably to the need of a search law such as will vitalize other laws to an extent that nothing else can.

We are conscious of the fact that there may be strong opposition to a search law; such has been pronounced unconstitutional, and a menace to the rights and liberties that have been guaranteed to us by our forefathers more than a hundred years ago. This may be correct. If it is true, it is regrettable that those who were conspicuous in building this nation and creating this State were not gifted with sufficient foresight to provide a means of escape from the present conditions, which are so threatening, so that the respectable, peace-loving, law-abiding citizen would not have to suffer injury, and the State be compelled to endure loss, for no other reason than because it is impracticable to control the lawless and reckless.

We confess, however, our inability to understand why such a search law as we need can be a serious menace to the liberties of any one except a law breaker; and no one can assume there is any disposition to do otherwise than to repress crime and evil, and to give the widest scope to every effort and impulse of the discreet, law-observing person. The liberties and well-being of the worthy can only be promoted and preserved by laying a heavy repressive hand upon the lawless.

Our method of observing laws marks us as worthy of the privilege of enacting them for ourselves or otherwise; and the laws enacted indicate progress and the ability to govern, or the opposite.

Massachusetts now has on her statute books one of the most

drastic fish and game search laws — section 77, chapter 91, Revised Laws — that has ever been enacted in any State of the Union. And who has ever heard that this law led to dangerous encroachments upon the rights or liberties of any citizen? Is the State any the worse because, occasionally, a reckless, greedy law-breaker has to pay the penalty for his misdeeds?

It is also true that many of the northern States have more or less drastic search laws for fish and game. Such laws are in force from the Atlantic to the Pacific; they are not uncommon. They have been found necessary for the welfare of the States where they exist. Is it not true that those States have constitutions that insure to their people the fullest liberty consistent with protection from the lawless? Have those States lost or abridged their liberties because of the laws referred to? Is it not a confession of weakness to fail to provide legal safeguards where they are needed?

Does any one conjecture that the old patriots, who unhesitatingly deposed a government and established another in its stead, and who risked their lives and fortunes to defend and maintain the change, would fail to make all possible provision for the suppression of illegal acts, and to vigorously maintain the dignity and majesty of the State, as provided by law? If it is true that no man is superior or inferior to the law, that laws are made to be obeyed, and that no people can disregard them or neglect to compel obedience to them without a sacrifice of liberty, why can there be objection to enacting a law such as we have suggested? Will it be perilous to follow the well-worn pathway of our sister States in this regard?

We are aware that this matter is the concern of the people; but, it being our special duty to study closely all matters that relate to the welfare of the State within the limitation of our efforts and observation, it would be disloyal if we failed to invite attention to the conditions set forth, and to plead that something be done to remedy them.

Status of Game. — The scarcity of the partridge during the hunting season of 1903 has been the most pronounced game feature this year. From all sections of the State, and practically from all parts of New England, there comes a universal report of the marked absence of this species, or at least a

marked absence of former abundance. It is true that here and there one can hear of localities where the decimation was less noticeable than elsewhere; indeed, some hunters may claim to have taken fair bags of birds, and they feel in consequence that the general story of scarcity is probably somewhat exaggerated, not to say pessimistic, and the outlook for the immediate future is far less gloomy than is generally believed. No one we have met or heard from has asserted that partridges were plentiful as expected, or as much so as last year. Without exception, the feeling has been that there has been a material change since 1902, but yet it is maintained by some sportsmen that "there was pretty good shooting." Nevertheless, the conditions at the close of this year were far from alarming.

On the other hand, the nearly unanimous consensus of statement and opinion is emphatically to the effect that the partridge has not been so scarce for many years; that most of those secured in the hunting season were old birds; and that every observation tends to confirm the feeling that the birds have been overtaken by some unfortunate natural disaster that has nearly exterminated them; at the best it has left scarcely any young birds; and the drain upon the flocks incident to hunting has nearly destroyed those which successfully weathered the winter, leaving few at the close of this year's hunting season upon which to depend for the continuance of the species. It cannot be denied that those who are depressed concerning the present, and fearful of the future, are largely in the majority.

Many causes have been assigned for the present condition of the partridge, and as many remedies are suggested whereby it may the sooner regain its status of last year. The abnormally cold, wet weather of June is the cause almost universally assigned for the destruction of the young partridge. There is a very wide range of statement to the effect that the young broods came out plentifully, strong, and with every prospect of thriving. The outlook was excellent as the fine days of late May passed by; it had not been so promising for many years, for "a good bunch of birds" had wintered well; they were in splendid condition for breeding, and the warm weather of May had caused earlier nesting than usual. A sudden change came.

The weather became cold and continuously wet to a degree that was extraordinary; a winter or early spring month was abruptly launched into mid-summer, with the attendant consequences. The little chicks, not yet sufficiently grown to be hardy, were exposed to drenching rains and a temperature below the normal for the season; the result being that, with few exceptions, they became chilled, soaked with cold water, and lay down and died by thousands. A few that were well grown lived, and perhaps there were others, hatched after the worst of the weather was past, that grew up and were well developed by October 1, when the shooting season opened. But there was a great slaughter, and the bereaved mother birds submitted to the inevitable, and did not attempt to hatch a second brood.

We give the following as an example of how the weather affected the young birds:—

Eight partridge eggs were secured by Superintendent Merrill, and chicks were hatched from all of them. Unfortunately, the day when this occurred was one of those severely cold, rainy days of June; consequently, the chicks all died immediately from the chill. There is no doubt that a similar disaster overtook thousands of other young partridge.

We believe the above is a correct statement of the actual facts. There are those who think the scarcity has been caused by the numerous foxes and skunks; others believe the majority of the birds have migrated, temporarily, at least, to better feeding grounds, — perhaps beyond the State, — and thus are scarce at home; and others still assign various other causes, such as shooting out of season, etc. There is, however, little difference of opinion as to the scarcity.

It has been claimed that large bebies of young partridge were seen in August, more than a month after the inclement weather of June; that those were not affected by cold or wet; but, just the same, they could not be found during the shooting season. The question is asked, “Where did they go?” That a certain number of young partridges survived is beyond question, but, at the best, those were only a bagatelle to the great mass that died, and there are doubtless less old birds left over at the close of this year than for a long period.

The woodcock is evidently increasing in a satisfactory manner. It breeds in Massachusetts to a considerable degree, — to a much larger extent than for several years. The native woodcock added to the migratory birds made better autumn shooting in some localities than is common. It is also stated that some of these native birds, and possibly others that have been bred farther north, are hardy, and stay later in the fall than they have been accustomed to.

The quail is generally reported abundant in the regions where it occurs to any extent. It did not suffer to the same degree that the partridge did. The claim is made that many nested so early that the young, which grow very rapidly, were large enough before June to endure the weather. Then, too, if the first brood of young quail succumbed, the mother bird lost little if any time; she immediately filled her nest with eggs a second time, and hatched out a second brood, which, though small at the beginning of the hunting season, were still in evidence, and soon grew big enough for game.

Aside from the partridge and the gray squirrel in Berkshire, where the food for it was scarce, game appears to have been more plentiful than usual; a condition due, no doubt, to the better observance of law, for many of the illegal practices that were rampant four years ago, and were potent in limiting the supply of game, have recently been almost abandoned.

Sea birds have been more than usually abundant along the coast of this State, and good duck shooting has been reported from many of the ponds and lakes. The presence of sea fowl in larger numbers than common is believed to be due in part to the influence of a heavy north-easterly gale early in October, which drove shorewards many flocks of birds that found it necessary to seek shelter and feeding grounds in harbors, sounds and lagoons during the prevalence of the storm, after which most of the ducks remained.

A notable incident of the year has been the occurrence of the wild pigeon in sufficient numbers to suggest that, if proper protection is furnished this species throughout the range of its migration, there may still be a possibility of staying its extermination. It is improbable it will ever “darken the sun” again with its innumerable millions; but there is a chance that

it may some time be plentiful enough for it to become an object of the sportsman's skill, providing the self-restraint exercised is now broad enough in its scope to prevent present killing.

Rabbits, according to all statements, are more uniformly plentiful. While the lack of a search law has been a serious hindrance in stopping the illegal use of ferrets for hunting rabbits, much has been done to limit it, consequently there has been a gain in the abundance of rabbits.

There is frequent mention of "hares" in the annual reports of the deputies, but the term has always been unexplained. The animals referred to may be Belgian hares, so called, or they may be the large, white hare, which possibly has become sufficiently plentiful to be noticed.

The gray squirrel is reported to be in reasonable abundance except in sections of Berkshire County, where there was a strange scarcity of nuts on the forest trees. Many of the squirrels were compelled to go elsewhere in search of food.

Deer are increasing, and are reported from all sections of the State. Occasionally one gets into a city. In some sections deer are quite numerous, herds of four to a dozen or more being seen.

We are introducing notices of song and insectivorous birds into this chapter, for the reason that it seems highly important that public attention should be invited to them. In a preceding chapter, and also immediately preceding the notices about small birds, detailed reasons are given why they should be better protected.

The extracts from the press, reports from the deputies and information from other sources, which follow under their respective heads, will give, by localities, a rather comprehensive, condensed idea of the status of game in various sections of the State.

Sea and Shore Birds. — For convenience, the wood duck and other species more or less closely related to the duck family or to the so-called shore, marsh and beach birds may be included under this head, so far at least as mention of them has been made.

The following extracts from the press and from the reports

of deputies or others will supplement what has been written about sea fowl, shore birds, and ducks which frequent inland ponds, like the black duck, wood duck and other species.

The Boston correspondent of "Forest and Stream," of Nov. 14, 1903, states:—

Our south shore gunners have been getting good bags of coot, ducks, yellow-legs, etc., of late, due largely to the storm. The season, they tell me, has been eccentric, with now and then a few good days, followed by very poor ones.

Chatham.—A despatch to the Boston "Herald" from Chatham, dated Nov. 28, 1903 (published the following day), stated:—

The shooting at Monomoy continues good, and the sportsmen who go to the grounds invariably find excellent sport. The flocks of coot are remaining inside of Monomoy at Gull Point, and it seems as if they would remain there all this season, instead of bedding outside at the Bend, as has been their habit for many years.

He reported the largest bag made by two men was "nearly fifty-six birds in two hours;" also that many ducks had been seen in Chatham Bay, including the eider; and that good black duck shooting was anticipated at Orleans and Chatham on the meadows, flats and ponds.

Beverly.—Beach birds were quite abundant this summer. — G. W. GOLDSMITH.

Wenham.—We have had the best duck shooting this season we have had for years, the birds being very plenty and in fine condition. — F. S. KNOWLTON.

Gloucester.—The shooting of water fowl at Ipswich Bay and Squam and Essex rivers has been fine for the sportsmen. Some of them have had bags of forty or fifty birds after an early morning's sport. Marsh and beach birds have been fairly plentiful; some good bags were brought in. — WILLIAM W. NIXON.

Sea bird shooting in this locality has been fair. — A. ROGERS.

Wakefield.—Black ducks and other ducks have been more abundant this year. — SAMUEL PARKER.

Hopedale.—There are more wild ducks than there have been for several years. — W. F. DURGIN.

East Norton. — Black ducks have been very plenty; wood ducks are scarce; snipe have been abundant. — E. C. PIKE.

Upton. — Ducks are plentiful. — J. A. BASTOW.

Gardner. — Ducks are seen very often. — F. S. CASAVANT.

Ludlow Centre. — A few ducks. — C. A. WHITE.

Pittsfield. — Ducks are plentiful on Onota Lake. — W. R. STEARNS.

West Tisbury. — There is a decided increase in all kinds of game. — JAMES LOOK.

Inasmuch as sea and shore birds, and especially the former, are the chief game species on Marthas Vineyard, it is assumed that the reference to increase of game by Mr. Look has special reference to sea fowl.

West Quincy. — Wild sea fowl have been abundant, and the sportsmen are taking good bags every day. — OTIS THAYER.

While this statement applies more specifically to Quincy Bay, the lower section of Boston harbor and contiguous waters, it also has a general application to the coast from Cape Ann to Plymouth.

Boston. — Wild fowl have been plentiful this year. — F. SERRILLA.

This report, by one of the deputies who has been continuously on the launch "Scoter," applies to the coast from Cape Ann to Plymouth, but more especially to lower Boston harbor, Quincy Bay and vicinity.

Have seen a great number of wild fowl about the harbor. — D. J. KILLION.

Essex County. — The black duck has bred in large numbers on meadows bordering the Ipswich River, in Middleton and Topsfield. Compared with other seasons, there was a small flight of shore birds. — T. L. BURNEY.

The Pittsfield "Eagle" of Aug. 8, 1903, says: —

Ducks are coming later and later every year to the lakes in the vicinity of Pittsfield, the number of cottages which have sprung up and the lengthening of the cottage season keeping the birds away from these waters until late in October and November.

Again, on October 3, it stated : —

Duck shooting on the lakes about the city has already begun, although as yet but few ducks excepting wood duck have put in their appearance, the weather being too warm.

Partridge, Woodcock and Quail. — The extracts from the reports of deputies, etc., given under this head are reduced to the limit, in order that they may cover a wider field of observation without being too voluminous. An effort has been made to give the gist of what has been expressed by every writer, but using the fewest possible words of those he has written. The interest in these three species of game birds is, however, so great, and has been so intensified because of the scarcity of the ruffed grouse, that we feel the information published should have a wide range. Following are the deputy reports : —

Nantucket. — There are a great many quail. — W. C. DUNHAM.

Game is about the same as last year. — E. F. SNOW.

Plymouth. — Quail are not as plenty as usual. — FREEMAN MANTER.

Swansea. — Partridge have not held their own ; either they did not breed, or the young birds were killed by the cold, wet storms of June. Quail are plentiful. — R. W. BUFFINGTON.

Owing to bad weather in early summer, partridge are very scarce ; quail quite plentiful. — E. D. YOUNG.

Raynham. — Game has increased in the past year, especially quail. — HENRY S. WILBUR.

Berkley. — Quail and partridge are quite plentiful. — CHARLES COREY.

Franklin. — Partridge are very scarce in Bristol and Norfolk counties ; quail are plentiful. — HERBERT A. BENT.

Sherborn. — Quail have increased wonderfully, but there are some not more than half grown at present (November 17). Ruffed grouse are not as plentiful as last year. Woodcock have been more numerous this season than I have seen in this State for fifteen years. — JAMES T. SMITH.

Medfield. — Partridge are very scarce, — nothing but old birds ; quail quite plentiful, but small ; a few woodcock, — all flight birds. — A. D. KINGSBURY.

East Norton. — Quail are very plenty, — more so than last year ; partridge and woodcock are scarce. — E. C. PIKE.

Pembroke. — Partridge and quail very scarce. There are no young

partridges; I think the cold weather in June killed all the young ones. Quail have raised their second litter. I started three coveys the other day; they were about the size of an English sparrow, none of them large enough to shoot. Woodcock are quite plentiful,—more than for many years at this season [November 4].—OTIS FOSTER.

Hingham.—Quail have been numerous this year, but partridge are not as plentiful as in other years.—W. I. JAMES.

Weymouth Heights.—Quail are very plentiful; partridge not so numerous as last year.—B. F. RICHARDS.

Braintree.—Partridge in our section of the country seem to be on the increase, and I account for it by the protection afforded them by the new law.—F. R. SMITH.

I have seen large numbers of quail; there are also lots of partridges.—A. T. HOLLINSHEAD.

Quincy.—The sportsmen have killed some birds, but they are nearly all old ones.—OTIS THAYER.

Partridge are scarce.—DAVID L. GORDON.

Quail and partridge are very scarce.—C. N. HUNT.

East Dedham.—Partridge are scarce, and quail are not very plentiful. . . . Sometimes I think partridges are increasing, and again I don't think they are.—SAMUEL HARRIS.

East Foxborough.—Partridge are not more numerous here and in Sharon than last year, but there are quite a number in Walpole and Wrentham. Although an old fox hunter, from the New England point of view, I feel that for the welfare of game birds and the poultry interests it is absolutely necessary for Norfolk and Bristol counties to offer a bounty on foxes. There will not be any first-class shooting in these counties until they do. Quail are more abundant here in the summer than for many years; they don't seem to be more so now than at this time last year.—WILLIAM H. LEONARD.

Needham.—Game of all kinds is not as plentiful as last season. Probably the forest fires are a cause of the scarcity of game in this section.—A. CROWELL.

Boston.—I have seen more quail in my back yard in Brighton than in all places visited, although last spring and summer the call of the quail could be heard everywhere. Partridge seem to be very scarce. I have not seen a woodcock in this district for a number of years.—HORACE W. JORDAN.

Woburn.—A few quail have been shot; partridge have been exceedingly scarce, and there have been no woodcock.—F. J. BROWN.

Medford.—Quail and grouse seem to hold their own.—HARRY L. HASKELL.

Arlington. — Partridge are as scarce as for several years; quail are fairly plenty, but not so much so as last year. — JOHN W. BAILEY.

Burlington and Lexington. — Partridge, quail and woodcock have decreased; same result in South Weymouth. They have increased in Milton. — C. A. BESSE.

North Lexington. — Game is scarce in this vicinity. — CHARLES E. WHEELER.

Stoneham. — Partridge are about the same as last year; woodcock are scarce; quail have increased. — R. S. RHULAND.

Wakefield. — The most noticeable fact in this vicinity in the fall of 1903 is the scarcity of partridge. No cause can be found for this except the continued wet weather during the breeding season, for the number of old birds that survived the winter was greater than usual. Several large broods of newly hatched chicks were seen on the day before the wet weather began, but practically no young birds were to be found this fall. It is at this time that the value of the law against the sale of partridge is most apparent in keeping out of the market the few old birds that are left. A few flights of woodcock have been seen, but their number is lessening every year. A serious factor in the destruction of woodcock seems to be the masses of telegraph wires that cover the sides of our streets and railroads. From the number of birds that are found dead under the wires, it seems to the writer that not enough importance has been ascribed to the apparently innocent telegraph wire as a destroyer of birds, especially the woodcock; whose flight is generally on a level with the wires. Quail have done well, and ought to increase more next year, if the [coming] winter is not too hard. — GEORGE M. POLAND.

Partridges are not so plentiful as last year. — SAMUEL PARKER.

Reading. — Partridges are not so plentiful as usual. The old birds brought out large broods, but something happened to them when about half grown; I think it was foxes, as they were unusually plenty this year. Quail are very abundant, and are fine and fat; woodcock are scarce. — H. E. MCINTIRE.

Lynnfield. — Quail are abundant, but partridge are very scarce; it has been too wet for them this year. — GEORGE WILLIAMS.

Salem. — Woodcock are more plentiful than I have ever known; partridges have not increased. . . . The young birds must have been killed by the cold, wet weather of last June. This also applies to quail. — T. B. BALLOU.

Wenham. — Partridge are not as plenty as last year, — only old birds are found; quail are not as plenty as in early summer; woodcock are very scarce. — F. S. KNOWLTON.

Beverly. — Woodcock came early last spring; I started one on

March 2. More have bred here this season than in the past. Partridge are not so plentiful as last year; those I have seen are old ones. There are plenty of . . . quail, but they are small. — HIRAM A. YOUNG.

Quail are as numerous as last year, but birds are small. Partridge and woodcock are few in number. — F. G. LEFAVOUR.

Quail have increased very much; woodcock seldom seen. — G. W. GOLDSMITH.

Manchester. — Partridge, quail and woodcock can be seen in small numbers. — H. THIEMANN.

Andover (Ballardvale P. O.). — Gunners report game birds very scarce. — E. H. SHATTUCK.

North Andover. — Partridge and quail seem to be on the increase. — WILLIAM J. TOOHEY.

Georgetown. — Partridge are very scarce, — no young birds. Quail are scarce; late birds are very small. A few woodcock, — flight birds. It seems the early birds got killed by the cold, wet spring. — H. L. BROWN.

Gloucester. — There are not so many quail as last year. — A. ROGERS.

Ayer. — Partridge are scarce; forest fires and wet June killed most of the young birds. There is a decided increase of quail. — J. I. MILLS.

South Acton. — All kinds of game are increasing except partridge; there are plenty of quail. — L. E. REED.

South Sudbury. — Partridge decidedly more plentiful, and quite tame; quail not so abundant. — PARKER H. KEMBLE.

Hudson. — Partridge are quite plentiful. — GEORGE A. DUDLEY.

Marlborough. — Partridge scarce, but quail quite numerous. — H. C. HUDSON and H. A. SNOW.

There are no young partridges this season; I heard of a few woodcock in flight time; there were flocks of quail. — L. HAPGOOD.

Northborough. — Partridges are nearly exterminated; owing to heavy rains in the spring, the young birds were destroyed. There are only few quail, — very small and poor. — ETHAN BOTHWELL.

Milford. — Quail are very plentiful, and larger than usual. Woodcock — mostly flight birds — reported numerous. Partridges were unusually abundant up to August. . . . I never saw more young birds in summer — in the byways and cart roads of the woods — than during the past one. When the hunting season opened, the cry went up of "No partridges." Evidently something happened to the birds after they were half grown. — W. D. PRENTISS.

Partridge are very scarce; quail are small, and we have only few woodcock. — J. L. MARTIN.

Grafton.—I don't think there are many partridges; . . . the season was bad; too much rain in . . . June, the time when the young would be hatching or just hatched. Then the enemies of the bird have bred well this year,—I mean foxes and skunks, etc. Quail are plentiful; woodcock have a little more than held their own. — GEORGE POGUE.

Upton.—Partridge seem to be getting scarce. . . . There do not seem to be any young birds. Quail hold their own. — P. SHAUGHNESSY.

Partridge and quail are as plentiful as in other years, and are of large size; woodcock scarce. — JOSEPH A. BASTOW.

Partridge and woodcock have been very scarce this year; quail are more plentiful. — D. A. WARREN.

Uxbridge.—Partridge are scarcer than they have been for a number of years; quail and woodcock are more plentiful. — ROBERT F. SMITH.

Millbury.—There seem to be as many opinions as hunters as to whether birds are plenty or scarce. I know one man who bagged fifteen birds in one day,—seven partridge and eight quail; in three hours I found four partridge and nine quail. — G. E. WHITEHEAD.

West Millbury.—Partridge are beginning to be a bird of the past; quail reported as usual. — S. F. STOCKWELL.

Sutton (Wilkinsonville P. O.).—Partridge and woodcock are very scarce; quail are plentiful. — G. H. BROWN.

Worcester.—Not one-quarter the birds there were two years ago. Hunters say shooting should be stopped two years, at least. — GEORGE M. ANDERSON.

Princeton.—It is my opinion that game is on the increase in this vicinity, as I have seen many . . . partridges and quail. — GUY H. CHASE.*

Leicester.—Game is about the same as last year; some nice flocks of quail and quite a few partridge. — TIMOTHY MCCARTHY.

Spencer.—This season bids fair to be the best we have had in Worcester County for a number of years. Young partridge hatched by the thousand, but . . . the cold, wet weather of June killed them. . . . When the hunting season opened, they could not be found. Quail are more plentiful than ever before. — A. D. PUTNAM.

Birds † are scarce this year, on account of the wet weather in June, which killed the young chicks. — JAMES A. HALL.

* Mr. Chase is superintendent of the Wachusett Mountain State Reservation, but holds an appointment as a deputy of this department.

† The term "birds," as used by sportsmen in the central and western sections of the State, usually is synonymous with partridge.

Charlton. — Not as many partridge this year as before ; the cold, wet weather last spring killed the young. Quail are increasing greatly ; I am surprised that there are so many. — CHARLES H. BALDWIN.

Southbridge. — Partridge and quail are not very plentiful this fall. — AUGUSTUS LOOMIS.

Webster. — Birds are very scarce. — JOSEPH P. LOVE.

Partridge are scarce ; quail are more plenty than usual. — R. C. HALL.

Palmer. — Partridge promised well in the spring, but have been noticeably scarce, which almost every one attributes to the wet weather in June — when it rained for about twenty-one days — killing the young birds. Quail are quite plentiful, but woodcock are scarce. — J. F. LUMAN.

Belchertown. — Partridge and quail very scarce, — caused by unusual climatic conditions. — A. L. PRATT.

Thorndike. — Partridge scarce ; quail plentiful. — M. C. HEALEY.

Ware. — Woodcock and quail have been quite numerous, but partridge not as plentiful as in past years. In my travels I have seen several flocks of young partridge, and have found both quail and woodcock very plentiful. — DENNIS SHEA.

Reports indicate an increase of partridge in some sections, and a decrease in others. I attribute this to the hawks and foxes being more plentiful in some places than in others ; the tendency of hawks to catch young partridge, and of foxes to destroy eggs besides catching young birds. If the State would pay a small bounty on foxes and hawks, — sufficient to encourage the farmers' boys to hunt and trap them, — it would be a move in the right direction. — A. H. ELDREDGE.

Royalston. — Game is scarce. — GEORGE E. CARKIN.

Athol. — Birds are scarce. — A. H. JEFTS.

Partridge and quail about the same as in the past. — W. H. FROST.

Gardner. — Partridge are more plentiful this fall than last, and quail seem to be on the increase. — F. S. CASAVANT.

Lunenburg. — Partridge were scarce the first of the season, — more plentiful now that the leaves have fallen ; quail are numerous. — CLARENCE H. COOKE.

Fitchburg. — Partridge are scarcer than in preceding seasons, but quail are increasing. — FRED J. PROCTOR.

Quail are holding their own ; partridge are very scarce. — C. O. GIBSON.

Lancaster. — Partridge, quail and woodcock are not very plenty. — A. J. KENNEDY.

Ludlow Centre. — Partridge, woodcock and quail are not plentiful, yet there are a few. — CHARLES A. WHITE.

In the western central section of the State and Berkshire County birds appear to have been slightly less affected than farther east, and consequently are more numerous, even if not abundant. The writer knows personally of several good bags that were taken at Ware and vicinity by Mr. T. S. Horrigan of the Brighton district of Boston, who, on the first day he hunted there, thought he flushed about forty partridge. Anticipations were not, however, realized, for the result of the June weather was scarcely recognized until after October 1, when the hunters found birds were less abundant than expected.

The Springfield "Republican" of October 2, in referring to the previous day's hunt, said : —

Many hunters went out early in the day. . . . Quails are reported as more plenty than for several years, and the birds are of good size. Partridges are not found in large numbers. . . . A few woodcock were also killed by those who know where to find them.

The Pittsfield "Eagle" of October 3, in discussing the opening of the hunting season, mentioned the names of persons who got from six to nine partridges, which were referred to as "excellent bags." It stated that "All report the birds as being very plentiful, although few woodcock or quail have been reported." A Westfield item in the Springfield "Republican" of same date indicated that the hunters generally had "fair luck" at the start, "although some returned without a feather." One bagged "eight woodcock and one partridge."

The following brief extracts from reports of the deputies give a clear view of the local conditions in the western section : —

Chesterfield. — Partridge and woodcock very scarce. — A. W. NICHOLS.

Haydenville. — Partridge and woodcock are scarce. — M. L. SORNBARGER.

Northampton. — Partridge and woodcock not very plentiful ; quail more abundant than last year. — WM. G. NICHOLL.

Buckland. — Ruffed grouse are not so plentiful as last year. There were many birds left over last fall [1902], and lots of young birds were hatched, but June was unusually cold and wet, and nearly all the young birds were killed. — E. C. HALL.

Partridge very scarce. — M. J. CRANSON.

Berkshire County. — Partridge and woodcock were plentiful in some sections. — A. M. NICHOLS.

On November 1 — the middle of the shooting season — Mr. Nichols wrote : —

The hunters are getting good bags of partridge and woodcock ; they are getting more woodcock now than they did at the opening of the hunting season.

Florida. — Grouse are fairly numerous, although the cold weather soon after the birds hatched depleted the flocks of young. — L. E. RUBERG.

Mr. Ruberg, writing under date of June 24, said : —

Birds are doing well, and I have seen several flocks. I know of nine that wintered together that were not shot into last fall at all.

New Lenox. — Unfavorable weather and a severe hail storm at a time when young partridge were unable to stand it were enough causes why partridge are so scarce here. — HARVEY H. DEWEY.

Lee. — Partridge hunters are well pleased with conditions. — C. H. PEASE.

Becket. — Woodcock have been plentiful. Partridge hatched well, but I think the cold rain in June killed many of them, as they are reported as in small broods, and decidedly scarce. — W. J. CROSS.

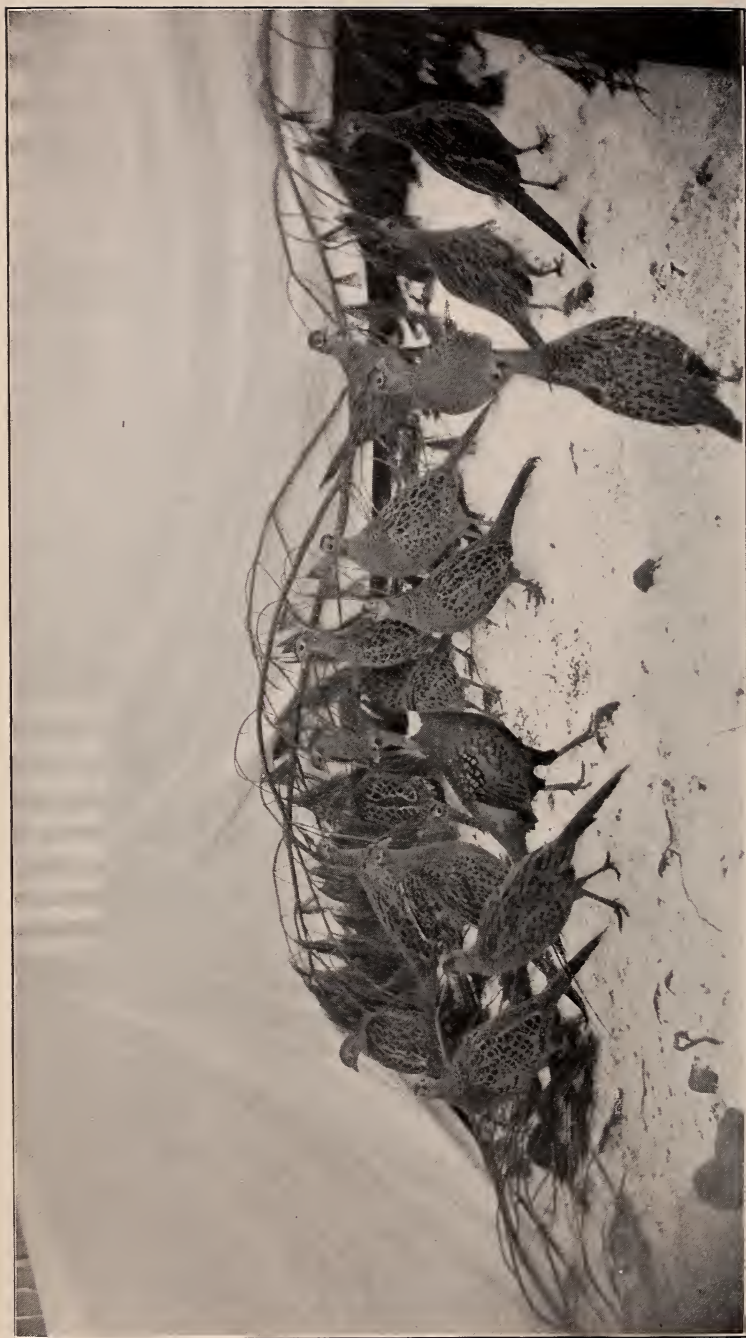
The Wild Pigeon. — The occurrence of the wild pigeon is a matter of public and scientific interest, and for this reason, and not because it is a game bird, reference to it is introduced here. Deputy Samuel Parker, who is perfectly familiar with the wild pigeon, makes mention of its appearance at Wakefield this year as follows : “ In September a flock of wild pigeons, twenty-five or thirty in number, came over Crystal Lake.” This notice of the presence of a species believed to be extinct is interesting, and must be important to ornithologists.

Pheasants. — The information that comes to us from all sections of the State emphasizes the fact that the pheasant is doing well ; that it is hardy, and able to successfully endure the rigors of our winters ; also that it is a prolific breeder, and, if treated intelligently, is liable to thrive to such a degree that it will become the most important land game bird in the Commonwealth, — barring the partridge. It is quite possible

it may become more plentiful than the partridge, and thus attain to the position it has reached in Oregon,—that of being “the game bird of the State.” But this can occur only as a numerical consideration, for, bird for bird, no one will expect it to rival the partridge in those particulars that place the latter in a class by itself. The position the pheasant can fill, while secondary, perhaps, is that of a fine game bird,—one that will probably develop desirable qualities when hunted that do not show now,—which will ultimately afford much sport; while its food qualities are so excellent that it probably has no superior in that particular.

In certain parts of the eastern section of the State the pheasant has increased wonderfully. This is especially true of the region which embraces West Gloucester, Manchester, Essex, Wenham, Danvers, Boxford, Topsfield and Hamilton. In some of these places it is reputed to be more abundant than the partridge has been for some years. Farmers complain that the pheasants are bold, as well as plentiful; that they pull up newly planted corn, peck the corn in the ear so as to ruin it, and in winter rob the hens of their food. Exactly how much of this is true, and how much imagination and suspicion, it is now difficult to determine. It is known that the Mongolian pheasant feeds voraciously on the cut worm and other insects that are injurious to growing crops, and its fondness for grains is also a matter of common knowledge. It is not, however, known to us whether the alleged pulling up of corn was due to an effort to secure the corn for food, or to get at cut worms. At any rate, the pheasant is blamed for all depredations of this kind, whether they are committed by crows or other birds, and the good it does the farmer is overlooked by many. This is not true of all, for we know of farmers who are anxious to keep them on their farms, and, in order to do it, plant certain kinds of grain that are believed to be attractive to the birds. Deputy Thiemann reports, that the farmers in Manchester and vicinity often plant peas, so that the wild pheasants may be well supplied with food.

A farmer near the line that separates the towns of Medford and Winchester says it is common to see pheasants in his corn field. The birds, he avers, do not trouble the corn,



MONGOLIAN PHEASANTS.

except that, in digging for cut worms, they may do slight damage.

Mr. W. B. Anderson, writing of the pheasant on Vancouver Island, B. C., says:—

This is one of the most useful birds of all to the farmer. He sometimes eats a bit of grain, but pays for this tenfold by the number of predatory insects he destroys. Farmers there are who condemn him and hound him off for his grain-eating propensities, but these are the ones who do not pause to think before rushing to conclusions. The insect-eating habit is strong in all the birds of the order gallinæ, to which belong the pheasants, grouse, partridges, quail, fowls, etc.; and the good they do in insect destroying was well exemplified this season, when certain persons, preferring to let their fowls have the garden crop in preference to the cut worms, turned in their chickens. Those in Cumberland and Union who did that are the only ones who now have any cabbages or other soft-fleshed vegetables. Those who depended on Paris green to accomplish the work lost more or less, especially cabbages and cauliflowers. The pheasant was working in the fields just as the bantams and other fowls were working in the gardens. Many of them fell victims to the poisoned bran placed in the fields to destroy the worm. We believe, however, that most of our district farmers are fully aware of the fact that these birds are of far greater benefit than harm, and accordingly deplore the untimely and unintentional destruction of so many of them.*

The foregoing should be sufficient to show that the pheasant is vastly beneficial, to the farmer in particular, even if it sometimes does exact a small tribute to keep itself from starving.

Many nests that were built in fields have been broken up, and eggs or fledgelings destroyed by mowing machines coming in contact with them. But, despite that, and unseasonable weather, there has been an increase of pheasants.

The following extracts from deputies' reports will show the present status of the pheasant, and how well it has thriven and increased in the past four years:—

Cape Cod.—Pheasants are reported at Provincetown, Truro, Wellfleet, Orleans, Barnstable, Sandwich and Falmouth.—S. B. RICH.

* Quoted in "Forest and Stream," Oct. 20, 1900.

Gloucester. — Pheasants are getting along excellently in this vicinity. They are in the woods of Rockport, Lanesville, Gloucester, West Gloucester, Essex, Manchester, Ipswich, Rowley, Newburyport, Danvers, Beverly and numerous other places. I can say from personal observation that they are thriving to an extent never dreamed of. They are so plentiful in the vicinity of Essex and Ipswich that the farmers are complaining of them for destroying their crops. During the past summer broods have been seen with nine young ones. The commissioners' endeavors to stock the covers of the State with this most beautiful of all game birds are fully appreciated in this vicinity. — WILLIAM W. NIXON.

Manchester. — There are a number of pheasants here. — C. O. HOWE.

Pheasants are plentiful. — H. THIEMANN.

Wenham. — Pheasants are increasing fast, — too fast to suit the farmer; they are very tame, and we see them almost every day. — F. S. KNOWLTON.

Beverly. — Pheasants are making wonderful progress in this section. Farmers complain of them, but, so far as I know, none have been killed. — HIRAM A. YOUNG.

Pheasants have increased very much. — G. W. GOLDSMITH.

Salem. — Pheasants are undoubtedly increasing, but they are unpopular with farmers; I am afraid some have been killed for destroying crops. — T. B. BALLOU.

Lynn. — There is a large increase of pheasants.* — THOMAS L. BURNEY.

Ballardvale. — Pheasants are doing well. — E. H. SHATTUCK.

Groveland. — Pheasants are all right. — GARDNER WOOD.

Georgetown. — Pheasants are doing well. — H. L. BROWN.

Malden. — Pheasants have been seen in the neighborhood of Malden and Stoneham. — SAMUEL WILLIAMS.

Arlington. — Pheasants are doing well. — J. W. BAILEY.

Reading. — Pheasants are doing well. . . . The male birds are the prettiest sight I ever saw in the woods. — H. E. MCINTIRE.

Marlborough. — Pheasants are quite abundant. — H. C. HUDSON and H. A. SNOW.

Fitchburg. — I believe pheasants are here to stay; they are quite plentiful. — FRED J. PROCTOR.

Spencer. — Pheasants are surely increasing. — A. D. PUTNAM.

Montague. — We frequently see some of the pheasants lately liberated here. — A. M. LYMAN.

* This information applies to all of the eastern and central sections of the State, but perhaps more especially to Essex County.

Northampton. — Pheasants are seen occasionally ; there are more about than are seen, as they are very shy. — W. G. NICHOLL.

Buckland. — Have seen a brood of half-grown pheasants this summer, which proves they will breed here. — E. C. HALL.

New Lenox. — Pheasants seem to have fared better than partridge, for three old birds had a fine flock of twenty-eight young on my place up to the first of the hunting season ; since then they have wandered off into the woods, and many doubtless have been shot. — H. H. DEWEY.

Berkshire County. — Pheasants are getting to be quite numerous. — A. M. NICHOLS.

Song and Insectivorous Birds. — While birds included in this classification cannot be considered game in any sense, it nevertheless seems expedient and desirable to place on record a few of the numerous references to them ; for it cannot be successfully shown that any birds protected by law, however valuable they may be, are more important to the public welfare or more deserving of public notice and State protection than the numerous species embraced under the head of song and insectivorous birds. Aside from those who have given special attention to the study of their habits, with particular reference to their food, there are few who have an adequate idea of the public benefit conferred by these species. Without them the farmer's work would be practically useless ; the horticulturist would be helpless ; our covers would be wastes of naked, perishing trees ; and our beautiful parks, which have cost millions to build, would be desolate, barren wastes, unattractive to the eye and useless to the public. The war now being waged in Boston and vicinity against insect pests will become universal throughout the State if the small birds are destroyed ; and in that event millions of dollars will not repair the damage caused by the reckless, law-breaking shooter.

A volume larger than this report might easily be written to show the necessity of protecting this class of our summer visitors by every means in our power ; indeed, such has been published by the State of New York, — a book of 66 pages quarto, entitled “ The Economic Value of Birds to the State.” It is to be hoped, however, that a brief allusion to this subject here, together with some notes which appear elsewhere, may

be sufficient to impress upon the public mind the necessity for prompt and vigorous action, in whatever way is necessary, to preserve our small birds from further destruction.

The commission has done what it could to preserve the birds, but there are limitations to its efforts, that will appear elsewhere; they are a decided handicap. The State is indebted to the agricultural department for the able and instructive papers issued by it, which show conclusively the economic value of insectivorous birds. It is time that due weight should be given to these results of careful and painstaking study and research. The lessons taught thereby should be heeded now. If they are, great benefits may result, while delay or neglect may cause future expense and hardship too great to be easily estimated. It is, however, our intention simply to call attention here to the status of the song and insectivorous birds, in order that the public may be informed on this subject, so far, at least, as the information comes to us.

Speaking in general terms, there has been an increase in small birds, which is probably less in evidence this year than it would have been, because of the abnormally cold and stormy June, which, there is reason to believe, had the same effect on the young of these small species that it had on larger birds.

As a rule, boys are less destructive than formerly to small birds: first, because of the advice and instruction received at school, as a result of efforts made by the Audubon Society; and, second, because they have found that it is dangerous to themselves to kill these species or disturb their nests or eggs, since they are liable to be haled before the courts by our deputies if they persist in violating laws protecting insect-eating or song birds. The persistent and irrepressible destroyers of small birds are recent immigrants from southern Europe and Asia Minor.

Nantucket. — There have been many song birds. — W. C. DUNHAM.

Weymouth. — Song birds have increased. — B. F. RICHARDS.

Quincy. — Italians are not killing as many song birds this year as usual. — C. N. HUNT.

Arlington. — A serious problem before us is how to prevent the extermination of our song and insectivorous birds. With our present laws, and the way in which they are enforced by our courts, the prospect

is not very bright. There has been a great deal of shooting of these birds by the same old offenders, — the Boston Italians, — who pretend to be hunting squirrels. — J. W. BAILEY.

Waltham. — Italians working on the Clinton pipe line have snared and slaughtered game and song birds within a mile of the line. — H. G. FROST.

Gloucester. — Song birds seem to be more plentiful than for a good many years, more especially robins. — W. W. NIXON.

Deer. — The following extracts give in part a correct idea of the distribution and increase of deer in this State : —

New Bedford. — Deer are very plentiful in this vicinity. They are frequently seen from passing trains north of this city, and recently a fawn which strayed up on the railroad was killed by a locomotive. — New Bedford despatch in Boston "Herald," Nov. 22, 1903.

Sandwich. — Held up by wild deer, while driving through the woods between here and Falmouth, was the strange experience of Robert W. Clark of this place Saturday evening last. . . . The deer, five in number, gave no warning of coming out of the woods, but jumped right out of a thick grove of pines into the road directly in front of the horse. . . . When the deer came to a halt in the road, Mr. Clark thought that they were going to charge the horse and carriage ; and for a few moments the situation looked serious, as there were two bucks among the number, and they alone could have made trouble for both man and beast. — Sandwich news item, Boston "Globe," Sept. 21, 1903.

Plymouth. — Deer are becoming numerous. I have seen several upon different occasions. — WALTER D. SHURTLEFF.

Marshfield. — Two deer made their appearance conspicuously at Sea View and Marshfield Hills this afternoon. — Boston "Herald," June 19, 1903.

Weymouth Heights. — Two deer were seen in this vicinity in April. — B. F. RICHARDS.

Swansea. — There are several deer in this section. — E. D. YOUNG.

Raynham. — Deer have been seen many times. — HENRY S. WILBUR.

Franklin. — Deer are frequently seen in this vicinity, sometimes as many as three together. — HERBERT A. BENT.

Sherborn. — There is a herd of fine deer here, — two bucks, one doe and two fawns. The farmers seem pleased that the deer are in this neighborhood, even if the animals get into the gardens occasionally ; I hear no fault found. — J. T. SMITH.

Milford. — Deer are seen quite often. — W. N. PRENTISS.

Hopedale. — Have seen deer several times this fall. — W. F. DURGIN.

Stoneham. — It has been reported that three deer were seen in this vicinity. — ROBERT S. RHULAND.

Woburn. — Have heard of no deer in this neighborhood, although several have been seen in Billerica. — F. J. BROWN.

Lexington. — Deer are frequently reported in and about Lexington. — E. D. McDONALD.

Reading. — Deer are seen often in this section. — H. E. MCINTIRE.

Wakefield. — Two deer have been seen in Wakefield. — SAMUEL PARKER.

West Upton. — Several deer have been seen in this vicinity. — D. A. WARREN.

Hudson. — A number of deer have been seen in this town. — GEORGE A. DUDLEY.

Millbury. — Deer are common now. — GEORGE E. WHITEHEAD.

Lancaster. — Deer are probably increasing; as many as six have been seen at once. — A. J. KENNEDY.

Gloucester. — Deer are reported seen at Gloucester, West Gloucester, Essex, Manchester, especially at West Gloucester and Essex, where they have been seen nearly every day, three or four being seen together at one time. — W. W. NIXON.

Manchester. — Deer not only eat grass, but have a great liking for vegetables; some people complain, and others plant peas especially for them. — HERMANN THIEMANN.

Wenham. — Deer are increasing. — FRED S. KNOWLTON.

Haverhill. — During the last four months I have seen fourteen deer. — EDOUARD MAILLOUX.

Groveland. — Deer are seen every week. — GARDNER WOOD.

Georgetown. — Deer are seen often. — H. L. BROWN.

Andover (Ballardvale P. O.). — Deer are numerous; four have been seen at one time, three at another, etc. — ELMER H. SHATTUCK.

Lynnfield. — I have seen three deer which were quite tame. — GEORGE WILLIAMS.

Lynn. — Deer are increasing rapidly all over the State, and if the dogs can be stopped from running them, we shall soon have plenty of deer in this section. — THOMAS L. BURNEY.

Ayer. — Deer are gaining in numbers. Last fall three or four in a bunch was the usual number; this year, from six to eight were seen. — J. I. MILLS.

Uxbridge. — Deer are seen frequently. A buck and two does wintered half a mile from my house. One doe had two fawns, and the other, one, this summer. — EDWIN F. TUTTLE.

Deer are seen often, and are very tame. — R. F. SMITH.

Southbridge. — Deer are seen often. — AUGUSTUS LOOMIS.

Webster. — Four deer have been seen at our lake. — JOSEPH P. LOVE.

There have been several deer seen here. — C. B. ADAMS.

Palmer. — Deer have been increasing rapidly the past year. — J. F. LUMAN.

Ludlow Centre. — I have seen from one to three deer at a time quite often. — CHARLES A. WHITE.

Spencer. — Deer are increasing fast. — A. D. PUTNAM.

Princeton. — While I have seen but few deer, I see tracks of them nearly every day. — GUY H. CHASE, Superintendent, Wachusett Mountain State Reservation.

West Gardner. — Deer have been more numerous this year than ever; it is a common occurrence to see from three to five together in the eastern part of the town. — F. S. CASAVANT.

North Dana. — There are lots of deer around here. — E. A. COLLIER.

Mr. H. E. Brown of North Dana says he has seen about forty deer inside of a year. — DENNIS SHEA.

Williamsburg (Haydenville P. O.). — Deer are increasing. — M. L. SORNBERGER.

Belchertown. — Deer are getting more plentiful every year. — A. L. PRATT.

Ware. — There is a large increase in the number of deer. It is common to see them among cattle and sheep while riding through the country. — A. H. ELDRIDGE.

Deer have been more numerous this year than ever. Mr. F. A. Stowell of Dana reports seeing twelve on his farm this summer; and Mr. Lamberton of Ware says four deer have stayed on his farm all summer, without doing any damage to his crops. — DENNIS SHEA.

Athol. — Deer are increasing very fast. — A. H. JEFTS.

Buckland. — Deer are quite plentiful; five or six are often seen at a time. — M. J. CRANSON.

Deer are seen occasionally in this section. — T. P. CLARE.

Deer seem to increase. — E. C. HALL.

Berkshire County. — Deer are seen everywhere in the western part of the State. — A. M. NICHOLS.

Florida (Hoosac Tunnel P. O.). — Deer are numerous. I have seen six at one time, and seldom fail to see one or more as I travel from my house to Hoosac Tunnel station every day. — LYMAN E. RUBERG.

Writing under date of June 24, Mr. Ruberg said: —

I tell you, Mr. Collins, that if this town Florida could be fenced in, it would not need any stocking to be a deer park. I am certain that in parts of the town it is not unusual to see as many as eight deer, and fourteen have been seen together by reliable persons in one day.

Adams. — Deer are increasing very rapidly; I saw six one Sunday on Greylock Mountain. — FRANCIS O'NEILL.

North Adams. — Deer have been even more numerous than usual about the city for the past few days, and on a recent morning two were seen frolicking together in Hillside cemetery. — North Adams "Transcript," June 29, 1903.

Charlemont. — Miles Ashton of this city while in Charlemont a couple of days ago saw a herd of seven deer. It is claimed that a herd of fifteen or sixteen have made their home in the vicinity of Charlemont during the entire winter. — North Adams "Evening Herald," Feb. 26, 1903.

Pittsfield. — Several small herds of deer have been seen this fall. — W. R. STEARNS.

New Lenox. — Deer are doing nicely. I have reason to believe they are increasing. — H. H. DEWEY.

Becket. — Deer are seen often, and are increasing; they don't seem to be very wild. — W. J. CROSS.

The Belgian Hare. — Comparatively little definite information has come to us concerning the Belgian hare. There is frequent mention of "hares" in the reports of the deputies in various parts of the State in connection with rabbits, but no descriptive or qualifying term tells what kind of hares is meant. Presumably the Belgian is referred to, for there has never been a similar general allusion to hares, and there is no known reason why the white hare should suddenly increase in numbers to a noticeable degree.

It would appear that in one case which has come to our knowledge the Belgian has been successfully crossed with the cotton-tail rabbit, although we are informed that other attempts in the same direction have failed.

Supt. Arthur Merrill of Wilkinsonville, in writing to the commission under date of March 9, 1903, says: —

I have read a portion of the report, and among the matters that interested me are the statements regarding the running qualities of the Belgian hare, as recently I have talked with a Millbury man who informed me that on a farm in Sutton a Belgian hare was crossed

with a common white rabbit, and their progeny allowed to run at liberty, making their home under an out-building, and running about the farm more or less. Here several times dogs used by ferreters took their walks and spoiled the hunt, as the animals ran, so the man expressed it, "like foxes," and refused to hole up. I have talked with many rabbit hunters about here, who have hoped to see the hare introduced, as they believe that in this way it will largely spoil ferreting.

Among those who have made special mention of the Belgian hare is Deputy Dennis Shea, who has liberated several lots in the central section of the State. He says: "We saw one of those hares that I let go there [Petersham] last fall, and Mr. Connor informed us that they are doing finely."

This statement is a sample of others that come to us; but there is a consensus of opinion that many of the Belgian hares are killed by owls, foxes and various other enemies. The ordinary domestic cat is credited with being very destructive to the Belgian, as it is known to be to other small animals and to birds.

However, it is believed that, once the Belgian hare gets established, it will maintain itself fully as well as the cotton-tail, if not better. Its wide distribution seems to make possible its survival.

Rabbits and Squirrels. — (Hares are frequently mentioned by the deputies with rabbits, and we prefer to publish these notices as they were written, under this head.) The brief notices of rabbits and squirrels given in this chapter will convey a good idea of their status throughout the State. These animals did not suffer to the same degree from the inclement summer weather as the birds did, hence the effect of the protection given to them is shown in their increase, except in those sections where the food for squirrels fell off abnormally.

Plymouth. — Game is not abundant, owing possibly to the increase of foxes, which destroy a large number of . . . rabbits. — W. D. SHURTLEFF.

Pembroke. — Gray squirrels are very scarce; rabbits are abundant. OTIS FOSTER.

Braintree. — There are a lot of rabbits this year, but gray squirrels do not show at all. — A. T. HOILINSHEAD.

Boston (New Dorchester P. O.). — Hares, rabbits and gray squirrels have increased in Milton. — CHARLES A. BESSE.

Franklin. — Rabbits and squirrels about as in former years.* — HERBERT A. BENT.

East Norton. — Rabbits, squirrels and coons are plentiful. — E. C. PIKE.

Hopedale. — There are quite a lot of rabbits. — W. F. DURGIN.

Milford. — Squirrels are not numerous; much of the best cover has been cut. — W. N. PRENTISS.

Rabbits are abundant. — J. L. MARTIN.

Medford. — Gray squirrels are very plentiful, and tame. — H. L. HASKELL.

Stoneham. — Rabbits are plentiful; gray squirrels about the same as last year. — R. S. RHULAND.

South Sudbury. — Rabbits are about the same; gray squirrels plentiful. — PARKER H. KEMBLE.

East Dedham. — Squirrels and rabbits are not plentiful. — SAMUEL HARRIS.

Hudson. — Rabbits are quite plentiful. — GEORGE A. DUDLEY.

Squirrels and rabbits are very plentiful in this section. — DANIEL D. ROSE.

Marlborough. — Gray squirrels are scarce; there are a few rabbits. — L. HAPGOOD.

Upton. — Rabbits are plentiful; they are not hunted with ferrets. — P. SHAUGHNESSY.

Grafton. — Rabbits and squirrels are more plentiful. — GEORGE POGUE.

Sutton (Wilkinsonville P. O.). — Not so many gray squirrels as last year; rabbits holding their own. — G. H. BROWN.

South Acton. — Rabbits are plentiful. — L. E. REED.

Wenham. — Gray squirrels are about the same. — F. S. KNOWLTON.

Beverly. — There are plenty of gray squirrels and rabbits. — HIRAM A. YOUNG.

Woburn. — Rabbits and hares have escaped notice of hunters, so far as I am able to hear. Gray squirrels are disappearing from the woods, and only exist where they are protected in the neighborhood of houses. — F. J. BROWN.

Reading. — There are plenty of rabbits and gray squirrels. — H. E. MCINTIRE.

Haverhill. — There are a good deal more squirrels and rabbits than last year. — EDOUARD MAILLOUX.

* This applies to the whole south-eastern part of the State.

North Andover. — Gray squirrels and rabbits seem to be increasing. — WM. J. TOOHEY.

Gloucester. — Rabbits and gray squirrels are plentiful, and will furnish good sport during the winter. — W. W. NIXON.

Lancaster. — Gray squirrels and rabbits are abundant. — A. J. KENNEDY.

Fitchburg. — Rabbits are quite plentiful; squirrels are holding their own. — C. O. GIBSON.

Worcester. — There seem to be many hares, rabbits and squirrels this year. — GEORGE M. ANDERSON.

Princeton. — I have seen many squirrels (red and gray) and rabbits. — GUY H. CHASE.

Ludlow Centre. — Gray squirrels are plentiful. — CHARLES A. WHITE.

Thorndike. — Rabbits are plentiful. — M. C. HEALEY.

Palmer. — Squirrels hold their own; rabbits are numerous. — J. F. LUMAN.

Ware. — Gray squirrels and rabbits are in greater numbers than ever before. — DENNIS SHEA.

Belchertown. — Gray squirrels and rabbits quite plentiful. — A. L. PRATT.

Spencer. — Rabbits are very plentiful. — A. D. PUTNAM.

Athol. — Squirrels are about the same as formerly. — W. H. FROST.

Gardner. — Hares and rabbits have been seen more this year than for the past two seasons. — F. S. CASAVANT.

Northampton. — Gray squirrels seem to be scarce. — T. P. CLARE.

Berkshire County. — Squirrels were plentiful in some parts. I counted fourteen gray squirrels at one time in a piece of woods at South Williamstown just before the season opened; there was little food for them, as nuts were scarce. Rabbits very plentiful this season. It is one of the best coon seasons that we have had in a number of years. — A. M. NICHOLS.

Florida. — Gray squirrels are not plentiful, because the food for them is scarce on the mountains this year. — L. E. RUBERG.

Buckland. — Gray squirrels and rabbits hold their own. — E. C. HALL.

Gray squirrels are abundant, but rabbits are very scarce. — M. J. CRANSON.

Adams. — Rabbits and hares are very plentiful; gray squirrels are scarce, for we have no nuts of any kind this year. — F. O'NEILL.

Pittsfield. — There are very few gray squirrels, hares and rabbits in this section. — W. R. STEARNS.

BREEDING GAME BIRDS AND ANIMALS.

At Winchester. — There has been practically no change in the breeding and rearing of Belgian hares at this station, other than a moderate increase in the output. There has been material change, however, in the breeding and rearing of game birds; many of the conditions which were so threatening and disastrous the previous year having been almost, or entirely, eliminated by the vigorous measures then adopted. Disease has been practically stamped out. As a consequence, the yield of young birds has been much enlarged; except for the severe weather, the result would have been far beyond that achieved. All this will appear under appropriate heads.

Pheasants. — The rearing of pheasants has been carried on as usual, although no season since we began the work has been more unfavorable in regard to climatic conditions. At best, the results are precarious and uncertain. During the latter part of June, the time of the largest hatchings, the cold rains caused a great loss of young pheasant chicks.

The disease introduced last year, in the attempt to acclimate several varieties of foreign birds, appeared again, but in a milder and much less fatal form; only about fifty birds were lost in consequence of it. Every possible effort has been made to eradicate it. The grounds were heavily dressed with air-slacked lime, and all the coops repeatedly cleansed with sulpho-naphthol. Having had less of the disease and milder in form this year leads to the hope that it will entirely disappear.

The new food alluded to in former reports has been in constant use for the last three years, and has proved to be all and more than was claimed for it. Young pheasants will take it freely as soon as they are able to feed.

Every breeder knows that no amount of subsequent feeding and care will make up for an unfortunate beginning. One strong, healthy bird is worth a dozen stunted ones.

Young pheasants fed on this food, mixed with maggots, are, at six weeks old, double the size of those fed with anything else. It is composed of wheat middlings or fine feed, Indian meal, finely ground beef scraps and flour of bone, scalded with a



BELGIAN HARE PENS AND PHEASANT COOPS AT WINCHESTER.

lightly cooked custard (milk and eggs), granulated by rubbing through a coarse wire sieve, one-quarter-inch mesh. About twenty-five bushels of this food have been used at this station this season for pheasant and bantam chicks. The eggs, from two to three hundred dozen, were furnished by the bantam hens.

Notwithstanding the many unavoidable drawbacks, there were more pheasants for distribution this season than any previous year. Our experience this year goes to confirm our previous conclusions, — that bantams are the best sitters and mothers for pheasant chicks. The larger ones will cover fifteen eggs well, and the smaller two or three less. As a rule, they are patient sitters, and, what is fully as necessary to success, the gentlest and kindest of hen mothers. Heavier hens are very likely to kill the young chicks.

Owing to the constant blasting on a ledge in the vicinity of the incubator house, the incubators have been used comparatively little. It was thought best to use the bantam hens almost entirely. Deep nests were made of coarse hay, to break the jar as much as possible.

In the wintering of young pheasants it is possibly as well to have their coops partially protected from severe storms; but housing or partly housing adult pheasants is a step in the wrong direction. We have on the ground five coops, enclosed, — tops, ends and north side. More adult birds have been lost there than in the open coops. Here, as with the Belgian hare, exposure to climatic changes is necessary to the maintenance of a hardy, vigorous stock.

The Mongolian or ring-necked pheasant is a native of a climate much more rigorous than ours, and suffers more from the heat of summer than from the cold of winter. This has been so thoroughly demonstrated that it is no longer an open question.

Experiments in hatching Eggs. — All breeders of birds in confinement have experienced disappointment and loss in consequence of many of the eggs failing to hatch. The average loss, whether in incubators or under hens, amounts to about fifty per cent. of the eggs.

An examination of the unhatched eggs shows that many of them are as clear and fresh as when laid. They are considered

unimpregnated. In others the chicks have died in every stage of development, up to the last day of incubation. The causes of these failures have never been understood. A great deal has been said and written in regard to it, and directions given for specially prepared foods and the treatment of fowls and birds to ensure fertility and to produce healthy chicks. Much of this is of little value, but is not wholly wrong, for whatever tends to produce strong, healthy condition in the parents will undoubtedly give strength and vitality to the offspring. Yet, despite all efforts, the fact still remains that a large portion of the eggs do not hatch.

The anatomical structure of the female bird is such that, when well mated, it seems almost impossible that any eggs should escape impregnation; and this is sustained by examining the supposed infertile eggs under the microscope, and by the fact that, as a rule, eggs of wild birds all hatch. If there is an exception, it is due to some imperfection or injury to the shell.

A careful study of the eggs of wild birds shows that the shell is closely coated with silica, not unlike that which covers the stalk of wheat and many other plants, rendering them impervious to air and water. Many of the egg shells of domesticated birds lack this coating.

Breeders know that a dead egg in the incubator will fill the chamber with sulphuretted hydrogen gas, which forces itself through the pores of the shell, and that the gas is liable to be absorbed by other eggs, which is fatal to the embryo. Such possible fatality is not dependent alone upon deleterious gases, for it is well known that in mammalia the introduction of common air into the womb is fatal to gestation. Following in the line of these facts, long and careful study and experiment have led to results that may be helpful to those who are breeding birds.

At the end of the hatching season a small surplus of bantam eggs afforded an opportunity for some experiments which had long been contemplated, a record of which is here appended:—

No. 1.—Forty-five bantam eggs, set in the usual way, under bantam hens, fifteen eggs under each, gave a hatch of a fraction over fifty per cent.

No. 2. — Fifteen eggs were immersed for a few minutes in a bath of ten per cent. silicate of soda, and dried on a wire screen, turning them as the top dried, to ensure the perfect glazing of the shell. Imperfections may be obviated by drying and dipping them again. Care should be taken that the eggs are perfectly coated, it makes but little difference how thick, provided it does not prevent the chicks escaping readily from the shell. This did not either retard or accelerate the hatching, and at the close of the twenty-first day every egg hatched.

No. 3. — Thirteen eggs were treated with fifteen per cent. silicate of soda ; all hatched.

No. 4. — Thirteen eggs were treated with twenty per cent. silicate of soda ; all hatched but one, and that held a dead chick about two-thirds grown ; this shell was imperfectly coated. The eggs were all carelessly collected, with no intention of setting them.

The advantage gained in Nos. 2, 3 and 4 over No. 1 was not only in the number of chicks, but they were remarkably strong and healthy ; there was not a weak one among them. They came out of the shells rapidly, and only slightly moist. The inside membrane adhered closely to the shell, and was as smooth as a porcelain cup.

For the benefit of those breeders who lay so much stress on specially prepared foods as a means of obtaining fertile eggs, we will say that the bantam mothers in these cases had been sitting, more or less, all summer, some of them for a total of fifty days, during which time they had hatched two broods of pheasants without leaving their little coops. All of that time and after, while laying the eggs with which these experiments were made, they were fed on nothing but whole or cracked corn, and no green food was given them.

To those who desire to test this method, we recommend the careful gathering of the eggs, and coating them the same day. After covering them, dry them well, and set them, large end or air-chamber down, in a cool place until wanted. An inch of dry sawdust or bran on the bottom of the receptacle will hold the eggs firmly in a vertical position.

Whatever is used to coat the shell should be chemically pure, and should contain nothing to injure the egg. It should ren-

der the shell impervious to air and water, and should be a non-conductor of electricity.

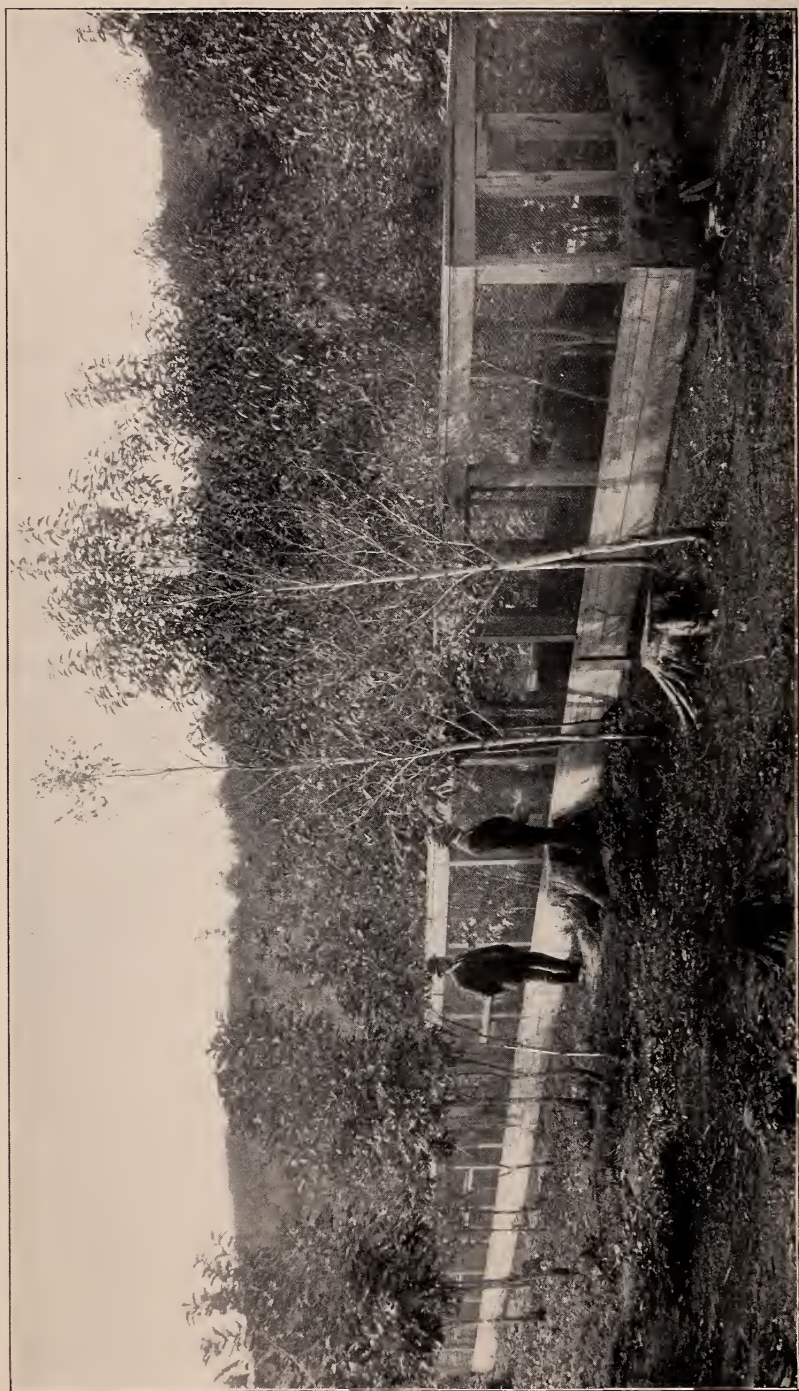
The air cell of the egg contains all the air the embryo needs until it breaks the shell. The egg is a little world, complete in itself, where the magnetic currents, generated by the chemical changes, enable the embryo to build up its material form.

It is hardly possible that these and other experiments, all pointing in the same direction, can be only coincident. They are not antagonistic to the natural production of bird life; on the contrary, they restore what artificial conditions have more or less perverted. While we may not, with our limited experience, be able to fully state what may practically result in consequence of these experiments, we can assert positively that eggs, hermetically sealed in the manner indicated, have hatched with phenomenal success; and this suggests important changes in the hatching of eggs, both under the hens and in the incubator.

Crossing Pheasants. — An interesting result was secured by crossing golden and Mongolian pheasants. This was, perhaps, suggested by the fact that the cock golden pheasant got out of the enclosure and did not return; he was probably stolen. A ring-necked cock was mated with the golden hens, and the result was that we raised some beautiful birds. They are nearly or quite as large as the Mongolian, with many of the extremely rich colors and long tail of the golden pheasant, mixed with distinctive markings of the former. If the new type breeds well, and is hardy, it will make an unusually beautiful addition to our game birds. No doubt it will be welcomed by all lovers of birds, and particularly by those who are fond of rich plumage.

Belgian Hares. — The breeding of these animals has been fairly successful. Notwithstanding their exposure to all climatic changes, they have remained perfectly healthy, no disease having appeared among them. A few of the young ones, that had their freedom in the enclosure, had not sense enough to keep under cover during the cold rains, and died in consequence of the exposure. They can stand any amount of cold, provided they do not get wet.

The old breeders are not as prolific as the younger ones, but



PHEASANT COOPS AT SUTTON.

this is more than compensated for by the stronger and more vigorous character of the offspring.

The rabbits are fed in the morning on a handful of oats each, and in the evening on chopped hay moistened and sprinkled with middlings or fine feed. In summer they have all the green food they want, and in winter are given a ration of turnips or carrots once or twice a week. With this food they will breed throughout the year. Those born in autumn and winter are more desirable than those of the hot season.

Sutton. — The breeding and rearing of birds and animals at the fish hatching station in Sutton — Wilkinsonville village — is gradually assuming important proportions. The place appears to be well adapted to this work. It is quiet, apparently comparatively free from the depredations of the domestic cat ; there is ample room on the State land, and sufficient shade for all purposes. There is every reason for anticipating success in raising Belgian hares. Six young hares were sent there in the fall, but they were not sufficiently developed to breed this year. They did well, and when placed in boxes on the side of a hill, where they had an opportunity to burrow, they immediately began to dig, and soon had deep, warm burrows to protect themselves from the inclement weather of the coming winter.

The rearing of pheasants is now a well-established feature of the work at this station, where a careful record is kept of all matters which may prove of public interest.

Report of the Superintendent. — The following report of Mr. Merrill, superintendent of the station, presents in a clear and comprehensive way the leading facts and observations in connection with pheasant breeding under his charge : —

STATE FISH HATCHERY, WILKINSONVILLE P. O., SUTTON, MASS.,

Nov. 9, 1903.

To the Commissioners on Fisheries and Game.

GENTLEMEN : — The brood stock of pheasants was slightly increased over that of last year, and consisted of nine cocks and thirty hens ; but the number of eggs obtained was somewhat less, owing to a lower average per bird, it being less than thirty for the present season, and thirty-eight for the year before. The number laid by individual birds varied from less than twelve by some of the year-old birds to more than sixty by some of the two-year-old birds ; the average of the first was twenty-four, of the latter forty. The eggs were obtained early,

the first in March, and the greater number in April and May; few were secured in June and none in July, though usually the birds lay well in those months, and the eggs then available often give the best results. From the total number of eggs obtained (eight hundred and fifty-three) five hundred and four chicks were hatched, showing a decided improvement in hatching over the past two years, but still far from being satisfactory. The improvement is possibly owing to superior conditions for keeping the brood stock. If this is so, better results may be expected in the future, as, because of the recent building of roomy yards, enclosing dry, brush-covered ground, the stock is removed for winter from the small breeding pens, where it is believed their vitality has been impaired by the dampness and close quarters.

The chicks hatched apparently as strong as usual, and no considerable loss was due to weakness; but during the latter part of June, when the largest lots hatched, a period of excessively cold and rainy weather destroyed a large number. During the better weather that followed the results were more satisfactory; but, owing to the rapid falling off in the yield of eggs at that time, the number secured from the late lots was smaller than usual. The loss among the half-grown birds was slight, as, because of ample pen room, they were confined before they were exposed to attacks by the enemies that have usually destroyed them at this age; the loss in the pens was practically nothing. Although confined young, the birds suffered no check in their development, and in August ninety of the oldest were liberated; they were in a very vigorous condition. The remaining twenty-five were held for future disposal.

The usual trouble with vermin attacking the young chicks was experienced; but many ways have been learned of keeping some of the troublesome pests at such a distance that the chicks can be reared on the open ground about the buildings of the station. However, the surrounding brush and tall grass sheltered the enemies that caused many chicks to disappear, and it was quite definitely known that cats and snakes were the chief agents in destroying them. The area of cleared land, although it has been considerably extended, will not always permit the coops to be placed where the chicks cannot enter the surrounding brush, which affords a cover and food that they delight in, but which also shelters the most troublesome of their foes. Each year, as far as the time available for that work would permit, the brush has been cut and the land smoothed to allow the free use of the scythe; with the continuance of this work and the extension of the pens, as new ones are built around the boundaries of the lot, an area will soon be cleared and enclosed where a large number of chicks can be kept, and be given reasonable protection.

The new pens were located on the hillside above the breeding pens, and were built thirty-six feet long and ninety-six feet wide, and from two to six feet high, according to the inequalities of the ground. At the upper or north side a roomy shelter and dusting shed was built. The top was made of wire netting tightly stretched over heavy cross-wires, which allowed the enclosure to receive the full sun all through the day. For shade through the summer a suitable number of trees were allowed to stand above the wire, and much of the low brush growing on the ground within the enclosure was saved. In the few months that the birds have been in the pens they have been more quiet and contented, have been in better plumage, and are free from the bruises they received by contact with the walls and tops of their former close quarters. The pens were intended mainly for wintering the brood stock, with the expectation that such roomy, healthy quarters would result in an increased vigor among the birds wintered, but they also served to hold the young stock until they were old enough for distribution, and were the means of producing better birds for liberation than have previously been grown in pens. Although these pens will be available each year for developing stock for distribution, they will not be sufficient for that purpose, even with no increase of brood stock, and it will be desirable to make additional pens for another season; but it will not be necessary to make them with the material and construction used in the finished pens, as they are desired for summer use only. The nature of the pens desired has been indicated in previous reports, and a more detailed statement will be made in good season for beginning any work on them.

Hens have been used exclusively for rearing the pheasants. A flock of bantams, as well as various kinds of larger hens suitable for the work, have been kept. Ordinarily, the results have been satisfactory, and, as the work has been regarded as experimental, it was better to depend on hens than to acquire the more expensive equipment for artificial hatching; but if any considerable extension of the work is contemplated, and for any difficult season like the present, it will certainly aid in the work to provide such an equipment.

The present season, as already noted, differed from any heretofore experienced in the severity of the weather at periods during the hatching season; and the effect of the cold storms was generally known through the destruction of domestic chicks and many broods of grouse. Whenever losses have occurred among the pheasants, they were generally due not to neglect, but to lack of attention from the hens; for perhaps in every case the hen would look after the pheasant chicks as carefully as she would her own. But the care under which a brood of chickens would thrive would often be wholly insufficient for the pheasants; and it was frequently seen that, with

a hen assiduously attending to her brood of pheasants, some were fatally chilled because she persisted in scratching for them, when they needed to be more frequently hovered.

During many days of severe cold it was necessary to shut the hens in darkened coops, in order that the chicks might have needed warmth and protection; at other times chicks partially chilled were warmed over a stove, and saved. But it was a matter of constant observation that scores were lost by being chilled, and there is strong reason for believing that this is a source of heavy loss in any season. At other places, where hens are used, similar experiences are reported, with sometimes more unsatisfactory results; while those places having brooders seem to have had little or no trouble. This justifies the belief that it would be profitable to use brooders here, even if only to carry the weaker broods through periods of cold weather. Hens would continue to be the chief dependence for hatching, and there is an ample stock of them on hand, with room for housing them; but, as they must be confined through the summer, there should be an extension of their yards, in order to keep them in the best condition and to get larger returns for their keeping. For the present season they have paid for their own food, the expense of raising a large flock of chickens and bantams, and the greater part of the supplies for the pheasants. It would not, I think, be expecting too much of them, in a favorable season, and if given the best care possible, if they paid for all of the food and supplies used in rearing the pheasants.

One of the greatest aids that could be provided for getting better returns from the hens, as well as securing the best and most convenient means of feeding the pheasants, would be to provide a small cooking house. It does not seem practical to do this work in any of the present buildings, as all the space in them, and even additional room, is urgently needed, some of which might be obtained by storing poultry feed in the new building. The building desired would not be large, or require much expensive material in its construction, and a stove suitable for use is already on hand.

An improvement in connection with rearing pheasants, which might well be considered in advance of its real need, is the construction of a basement under the barn. This could be built without any additional labor, and the only material required would be cement. The stove needed now lies under or near the building. The additional room thus provided will be urgently needed, if any work is done with incubators and brooders; and even for present uses the space can be provided so economically that it would be profitable to do the work.

Respectfully,

ARTHUR MERRILL.



A BANTAM HEN AND HER BROOD OF PHEASANTS.

Experiments Elsewhere. — Messrs. Paul Butler of Lowell and Charles W. Dimick of Cambridge continued the experiments they began last year in attempting to rear partridges, but the severe weather of June defeated their efforts. Mr. Dimick has, however, secured a number of additional adult partridge from Maine, and he hopes to be in a favorable position next spring to continue the experiments.

Dr. C. F. Hodge of Clark University, at Worcester, has also conducted some experiments in breeding partridge, under the auspices of the commission. The status of the partridge, its excellence as a game bird, and the fact that it is non-migratory, are reasons, we think, why all possible should be done to study it scientifically, with the object in view to ascertain if it is practicable to breed it in confinement, or when held in quasi-control on enclosed areas of wild land or parks.

While Dr. Hodge did not meet with the success hoped for, he made some interesting observations, which will doubtless add to the general knowledge of the partridge. His report follows: —

DEC. 5, 1903. — . . . I secured twenty partridge eggs from three different nests, and have the following observations to report: —

First. — Taking part of the eggs from a nest in two of these cases did not cause the partridge to abandon the nest. The third nest was too far away to revisit, or at least, while I fully intended to do so, I was not able to find the time to make the trip. It is often stated that taking even a single egg from a clutch — even if this is done with a spoon, so that no scent of the human hand is left about the nest — will cause the bird to desert. Although I should like to investigate this further, I have as yet found nothing to support this view.

Second. — Dogs do not seem to be able to scent a partridge on the nest. I tested this very thoroughly with three so-called “crack” partridge dogs, — two pointers and one English setter. All these dogs, as I was told by their owners, had hunted for a number of seasons, and had scores of birds to their credit. I took them out to one of the nests, and allowed them to range all around it. In no instance did a dog offer to point the bird, and in no case did a dog even so much as flush the bird by accident. Even after flushing the bird, none of the dogs paid the slightest attention to the warm nest, when led up to within a foot or two of it. While making these tests, all the dogs pointed quail and cock partridges wherever they came across their tracks. The above fact has often been noted by hunters, and

seems to be fully supported by all the evidence I have been able to secure.

Third. — The food of the young partridge. I succeeded in hatching thirteen of the eggs, but six of the chicks were either deformed, or too weak to begin to feed. The other seven appeared to be vigorous, and began catching flies and other small insects the day after hatching. I had reared an abundance of meal worms and maggots, and was able to catch any number of flies and other insects by means of traps and insect nets. The young birds also ate small earthworms and mosquito wrigglers. I tested them with a great variety of prepared foods, — grated egg, bread crumbs, scraped raw meat, grated boiled meat, grits, boiled rice, millet and other small seeds, grass, clover, chickweed, partridge and wintergreen berries, etc. They would either pay no attention to any of these things, or, if they did pick at them at all, would not do so but once. The only prepared food which they could be induced to take in some quantity was freshly curdled milk, — sweet curds.

The weather was cold, rainy and generally unfavorable. During warm, sunny spells the chicks were given the range of the yard and garden, and closely followed in order to study their natural feeding habits. On such occasions the young birds showed no inclination to keep together; each one struck out for himself, and hence it required as many observers as there were birds at liberty. They would pay no attention to a bantam hen with which I tried for a time to rear them, and, as she had four chicks of her own, she paid no attention to them; she would, however, brood them and treat them as her own chicks when they were with her; but the partridges cared nothing for her calls or for the food of the bantam chicks. How a hen partridge manages to keep her brood together is a mystery to me. I supposed it might be an advantage to bring them up together, but bantam and partridge chicks do not mix any more than oil and water. I shall not try to rear mixed broods again.

I consider the most important fact that I have been able to observe with reference to the food of partridge chicks the extreme smallness of the insects they seem to prefer. Plant lice, mealy bugs, thrips and larvæ would be snapped up at almost every step of the young chick. They would be snapping incessantly among the leaves and grass, and, with my face within a few inches of the chick, I was for some time unable to see what it was catching. The young chicks would often spend minutes picking the plant lice from a single lettuce plant, and would follow the rows from plant to plant. Their feeding instinct seemed to lead them to search especially the under side of leaves, where insects habitually hide during the day. I am convinced, from these observations, that I tried to feed too many large maggots

and other insects ; and, if I am permitted to try the experiment again, I shall aim to provide an abundance of plants infested with plant lice and thrips.

Fourth. — Instincts of fear and tamability of partridge chicks. I was able to keep the chicks alive for fifteen days. During this time numerous photographs were taken, which demonstrate the point I wish to make under this head. During the whole time I was not able to observe a single indication of wildness or of fear of man. None of the birds attempted to run away or to hide, to crouch or “freeze.” They were as tame as any young chicks I ever reared. At a week old they had grown wing feathers, and could make short flights of twenty feet or so ; and, by adopting a uniform whistle when feeding, I got them to recognize it so that they would run or fly to me when the whistle was given. When cold, they would creep between my hands and nestle down to brood and go to sleep. While feeding they soon learned to perch on my finger, while I carried them about among the leaves of the rose bushes, from which they picked the aphides and slugs, often spying the latter before I did. I never had tamer young birds of any kind, chickens not excepted. I am convinced that their natural instinct to wander and range widely for insect food has led to the opinion that they run away because of wildness ; but this is a mistake, for partridge chicks, at least, under two weeks old. We lost none of our chicks in this way, but many others have ; and, while they may be inclined to ascribe this to the instinct of wildness, I am convinced that it is better explained on the grounds of pure accident, associated with protective coloration, — it is merely the problem of the needle in the haystack.

One season, I find, is a short time to work on the problem of taming the American partridge. I feel, however, that I have learned a good deal which will be of great value to me in possible future experiments. As it is, I think, if the weather had been more favorable, — it was really so cold and wet that it killed most of the partridge broods in the woods, — I should now have a flock of six or seven tame birds to report to you. . . . I should like to stick to this until I can show you a flock of tame partridges breeding in semi-confinement.

Very truly yours,

C. F. HODGE.

DISTRIBUTION OF GAME BIRDS AND ANIMALS.

At no previous time has the distribution of game birds and animals been so large as during 1903. Four hundred and twenty-four pheasants have been liberated in various sections of the State, in compliance with the requests of applicants.

The localities where these were liberated, and a list of the applicants, will be found in the Appendix. In addition to the pheasants liberated, more than a hundred have been kept over for liberation next year.

The Belgian hares distributed numbered two hundred and sixteen, which is more than we have ever liberated in the covers in any previous year. The points of distribution and the persons to whom the hares were sent are shown in the Appendix. In all cases, however, both as relates to birds and animals, our deputies looked after their liberation in the covers.

For the first time in a considerable period we have been able to comply with all applications for birds and animals, although the public desire for these has been as large as ever.

ENFORCEMENT OF THE LAW.

Financial Resources.—As heretofore, it is not practicable to indicate with anything like exactness the sum of money devoted to the enforcement of law. This is due to various reasons. First, there is no specific appropriation for this work, nor can there be, without subjecting the department to much embarrassment, and actually establishing an obstacle that might be a serious hindrance to success. The reason for this is found in the fact that the deputies are assigned to a variety of duties, as the needs of the service demand; and in the same day—practically at the same time—an officer may be giving attention to two or three kinds of work. Thus, a certain number of deputies may be detailed for the distribution of fish, birds or animals, a class of work that is going on more or less for eight months of the year. An officer may canvass the coast for information relating to fisheries, or he may be required to serve in some other capacity. But, wherever he is sent, he is so trained that his eyes and ears are open to observe any violation of the fish and game laws. In case there is such, the messenger is promptly transferred into a law officer; and he who may deliver a consignment of fish or birds in the morning, or be peacefully seeking information of the commercial fisheries, may be in a court room an hour or two later, trying to convict some one found in the act of breaking the law. Again, the publications containing laws,

or abstracts of laws, the issuance of which is an important part of the law-enforcing work, are paid for from another appropriation.

For these reasons, and others which might be cited, it is impossible to give with exactness the amount of money actually devoted to the enforcement of law. Perhaps it may suffice to say that the sum estimated as necessary for this work, \$12,340, was appropriated, and this will be nearly used; although, as indicated, incidentally much is done with it besides the single duty it was intended to pay for.

The allotment for enforcing law was larger than heretofore in the bulk sum; but, as this amount was intended to supply the means for building a launch, the money actually available for paying deputies' salaries and expenses was less than usual. This was due to the fact that the launch cost considerably more than double what was estimated. As a result, it was impracticable to have as many paid deputies as common during the open hunting season, and for a few days before and after that period, when violations are liable to be more frequent than at any other time.

Force employed. — The force has consisted of: (1) salaried deputies, serving throughout the year; (2) special deputies, on full pay for short terms of service, chiefly on the launch; (3) one special deputy, on very limited salary; (4) special deputies, with small annual salaries, for (a) care of State pond and (b) fishway; (5) deputies paid by clubs; and (6) unpaid deputies.

After Jan. 15, 1903, we had on the roll eight permanent deputies, one of the regular force having been dropped, and three specials. One of the latter was in charge of Mill Pond at Yarmouth, another was caretaker of the Lawrence fishway, and the other was on a small salary at Nantucket. About midsummer the latter resigned. The regular force was increased by the addition of two members, and for the first time in the history of the commission the system of competitive examination was introduced. This was due chiefly to the fact that there were thirteen applicants for one position; eleven took the examination. The result was satisfactory, and it is probable the system will be continued.

In August, after the launch was put afloat, a man was appointed as deputy, to go on her with the special object of acting as engineer, he having served in that capacity the previous summer, when we had the naphtha dory chartered. Later, another man was appointed as a deputy to go on the launch. Both of these continued until the close of the year. In the spring, at the opening of the trout season, a deputy was employed on salary for a few weeks. During most of the open season for game three of the salaried deputies were detailed for the distribution of fish, pheasants and hares. They were also assigned to this duty in the spring for several weeks. One of the regular force, John F. Luman, was ordered to the office October 1, and retained there until the close of the year, in the capacity of acting chief deputy, thus relieving the chairman from the onerous duty of directing the law-enforcing work while preparing the annual report. He performed this duty with much tact and efficiency.

There has been a material enlargement in the unsalaried force, which has numbered about one hundred and seventy-five deputies. The men composing this force are distributed all over the State, and they are from nearly all walks of life. Capitalists, lawyers, doctors, merchants, members or ex-members of the Legislature, farmers, and men in many other walks of life, are members of this force, the sole motive of which is to secure better protection of fish and game.

System adopted. — The system for the enforcement of the fish and game laws remains the same. It has proved satisfactory. A full description of it appeared in our last report, and need not be repeated. It has been amplified only to the extent that a larger number of fish and game law pamphlets and posters has been published and distributed, and that the booklets have contained new matter in the shape of lists of ponds stocked and closed, the date of closing and the nature of the regulations, — a class of information helpful alike to citizens and deputies.

Some fourteen thousand or fifteen thousand documents have been distributed, eight thousand of these containing the complete fish and game laws, and lists of ponds stocked under section 19, chapter 91, Revised Laws; and others being abstracts, posters in English or Italian, or special laws. The

press has shown its usual intelligent zeal in spreading broadcast information about the fish and game laws.

A notable advance in the means for enforcing those laws that relate to sea coast fishing and hunting was the building of the launch "Scoter," elsewhere more fully described. Since her advent, in August, she has had an excellent effect in repressing illegal shooting along the coast, and in preventing transgressions of law in the smelt and lobster fisheries. Two of the most notorious dealers in short lobsters, each of whom ran a naphtha dory, have been driven out of the business, and others have declared their intention to quit the sale of illegal lobsters.

Had the full penalty of the law been given to some, the aggregate fines for lobster cases would have been thousands of dollars; only the small fraction that was imposed amounted to quite a sum.

By reference to the tabulated statement of arrests and convictions, in the Appendix, it will be seen that the system adopted has worked well; for, with the extremely small number of active salaried deputies available for the law-enforcing work, — amounting to only five persons for the entire State at the busiest season, outside of those on the launch, and some of those occasionally ill from exposure, — the number of arrests exceeds that of any previous year since the Attorney-General decided that it was not properly incumbent upon us to enforce the law against Sunday fishing. The growing efficiency of the deputies, especially in team work, and the readiness with which the unsalaried deputies co-operate with the active force whenever practicable, are matters for congratulation, and they strongly emphasize the beneficial results to be derived from having a well-thought-out plan of operation.

Deputy John F. Luman, who has visited all sections of the State in the pursuance of his duties, reports that the work of the commission, in the prompt and tactful enforcement of the law, has secured large credit from the public for the system adopted. As an illustration of the working of the system, he refers to an instance where a complaint was given one of the salaried deputies in the morning, with orders sending him sixty miles into the country, to co-operate with another deputy. Arriving at their destination, they went to work on the case,

and at 4 P.M. of the same day "landed their man." Many similar cases could be cited to show the efficiency of the service in the enforcement of law, and how men widely separated and working on different cases one day may be co-operating with each other the next day.

That part of the system which involves the appointment of unpaid deputies is evidently growing in public favor, due, it is believed, to the effort made to place this service on a high plane, and beyond the ill-concealed suspicion or reproach that once attached to it. Men of the highest character, and often with more than a local reputation, have applied for appointment on this force solely because of their interest in the protection of fish and game. Not infrequently they have temporarily neglected their private business to look after the welfare of the State, and that, too, without hope, expectation or desire of any personal gain. Examples which could be cited evince an unselfish devotion to the State, worthy of all praise. It would be a pleasant task to individualize these cases, but lack of space does not permit it.

Too much cannot be said in commendation of the salaried deputies. Although receiving only small pay, they have labored with zeal and *esprit de corps* that could not be excelled. It has been the purpose of the commission to train these men to be alert, and to hesitate at no undertaking that has the remotest possibility of success. As a result, no risk or hardship is too great to deter them from a zealous performance of their duty. They have faced with equal resolution the pointed gun or bludgeon of the poacher; have endured hours of exposure at night or in storms; or have boldly chased law-breakers through foaming breakers, at imminent risk of life. More could not be asked. It is creditable, too, to this little force, that its membership embraces those capable of directing the work in accordance with the system adopted. Best of all, the force is so organized, and the system works so satisfactorily, that temporary expansion is possible without a jar or hitch to interfere with or delay the work. At the same time, men are being trained in the duties of deputies without expense to the State, and from those so prepared can be selected special deputies, or those for longer terms of salaried service.

The Launch "Scoter."—The "Scoter" was designed by the chairman, to meet the special needs of the commission for a roomy launch that would combine seaworthiness, speed, accommodations for the crew, and a draught sufficiently shallow to enable her to chase naphtha fishing dories or other boats into shoal water, if they should chance to go there with the purpose of escaping pursuit.

The launch is intended solely for the enforcement of such of the fish and game laws as apply to certain coast fisheries, especially the lobster and smelt fisheries, and the pursuit of sea fowl. Inasmuch as many power-driven boats are now employed in fishing, and launches of various sorts may be illegally used for pursuing sea fowl, it was necessary to have a reasonably swift launch, in order that she could overhaul other craft she might have occasion to chase.

At first it was thought a high-power open dory would answer the purpose, but after careful consideration it was decided such a boat would lack the requisite speed and would not have the necessary endurance to make her a profitable investment for the State; and, besides, the crew could not live upon her; they would always be dependent upon hotels, and their living expenses would be largely increased. It was, therefore, decided to build a launch of moderate dimensions, with a canoe-shaped stern, cockpit large enough for any anticipated crew, and with a cabin in which the crew could sleep, cook and eat.

The "Scoter" was built at East Boston by the Jeffries' Point Yacht Yard and Boat Building Company. The contract was signed on May 15, 1903, and she was launched on August 3, although not then complete. It was some days later before she was fitted with whistle and pump. Certain fittings, such as the awnings and canvas covers, were not completed for weeks or months. The last of these were delivered in November.

The "Scoter" is a carvel-built, sharp-ended, keel boat, with a long, overhanging bow, round bilge, long run, canoe-shaped stern, and skag. In the after section the bottom is nearly a dead flat. The launch is decked forward and aft, with a cockpit abaft the cabin. The deck runs along each side of the

cockpit, with a width varying from a foot to fifteen inches. The planks forming the sides of the cabin trunk continue aft (at less height) around the cockpit as washboards. Forward of the trunk is a circular hatch that locks underneath. This gives admission to the forward hold, where are stowed the hawsers and anchors. Immediately forward of the hatch is an oak bitt-head, to which the riding hawser or a tow line can be belayed. The cabin trunk is of the ordinary knockabout or "mandolin" type, with oak sides and canvas-covered, pine top. There are three circular screw lights on each side of the cabin. The interior is panelled and finished in the natural wood. There are lockers on each side, fitted with adjustable covers and leather cushions. Provision is made for extending the lockers across the entire width of the cabin floor, and there are additional cushions to cover all the space, in order to increase the sleeping accommodations to the maximum. In the day time the bed clothing is stowed within the lockers, where also are carried wearing apparel, boots, etc. At the forward end of the cabin, on the starboard side, is a locker for hanging oil clothes; at the after end of the starboard locker is a knockabout water-closet; there is a dish closet aft on the port side, and underneath the latter, with proper connections for drainage, is an ice box for the preservation of food. An oil stove furnishes the means for cooking. There is an adjustable table, large enough for six to sit at. When in use it is suspended from the top of the cabin with long iron hooks; at other times it is fastened close underneath the cabin top.

The frame, including stem, sternpost, keel, keelson, skag, breast hooks, deck frame, timbers, bed pieces for engine, and bow rails, are of oak. The sides of the cabin trunk, bow rails, hatch coaming, washboards, seats, foot gratings, and finish in cockpit, top streak of plank, and beads or chafing streaks, are also oak. With the exception named, the outside planking is one-inch white cedar, copper-riveted at the butts.

The frames are $1\frac{1}{2}$ by $1\frac{5}{8}$ inches, spaced 9 inches from centre to centre. These are united with floor frames of the same dimensions. The deck frames are $2\frac{3}{8}$ by $1\frac{1}{4}$ inches, spaced 15 inches. The keel varies in depth outside planking from 2 to 5 inches, and merges into the skag; it is 8 inches wide in the

centre, tapering at ends. The stem is 6 by $3\frac{3}{4}$ inches, tapering to $\frac{3}{4}$ inch on forward side, and is finished with half-round brass on forward edge. It curves easily into the keel. The ceiling is $\frac{1}{2}$ inch cedar. The deck is $\frac{7}{8}$ inch pine, covered with canvas, and the top of the house is of the same material. There is a brass ventilator in the after deck. The cockpit has a hard pine floor and oak gratings to lay over the floor. The balance rudder is of bronze, and the foot of it steps into a metal band that curves beneath the screw from the skag.

The launch has a ten horse-power two-cylinder Murray and Tregurtha naphtha engine, and a mechanical whistle and pump. The naphtha is carried in two copper tanks, each subdivided into compartments. One of these is close up under the deck on each side of the cockpit, the forward end of each tank coming close against the after end of the cabin. This arrangement, which is satisfactory in other respects, removes the danger of ignition or explosion that might result if there was a single tank at the bow, as usual, and a fire for cooking was lighted in the cabin; and it also centralizes the weights, and to that extent relieves the launch from a tendency to pitch heavily if caught outside in a rough sea, as she is liable to be.

There is an awning over the cockpit, which to some extent shelters the engine and the men from rain, etc. This is supported upon brass standards that screw into lugs on the deck. It is, therefore, easy to remove the awning, especially if it is necessary to change the appearance of the launch. The "Scoter" was designed with the special purpose of being easily adapted to disguise, for this is important; some provision has been made in that direction, and more will be made. Her effective work may often depend upon the fact that she is not known at a distance.

The launch is equipped with regulation running and signal lights, compass and various other necessary articles.

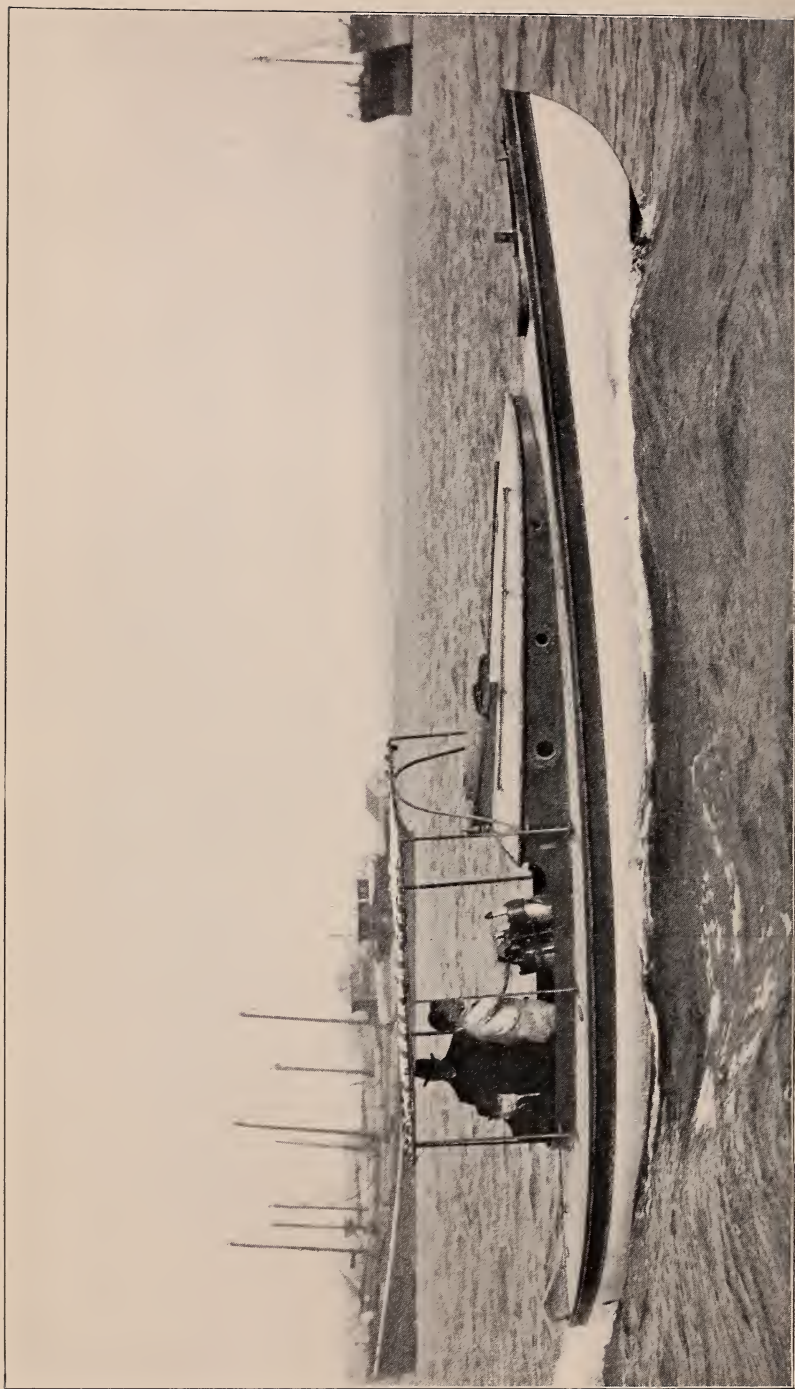
The "Scoter" has seen hard service in the period she has been at work. She has proved to be a good sea boat; although her bow is sharp, the moderate overhang gives her reserve buoyancy, so that she falls easily into a sea, and does not plunge deeply. Even when driven at full speed against a

north-west gale, while coming in from off Minot's Light, she never once plunged her bow under the steep, choppy seas that were running. Her speed has never been officially tested, but it is estimated she will run between ten and twelve miles an hour. The illustration shows her running down Boston harbor in a gale at full speed.

Following are the principal dimensions : length over all, 32 feet 10 inches ; on water line, 28 feet 3 inches ; beam, extreme, 7 feet 8 inches ; on water line, 6 feet 5 inches ; depth, amidship, gunwale to rabbet, 2 feet 9 inches ; draft, 2 feet 6 inches ; length of cabin trunk, 10 feet 6 inches ; extreme width at after end (it tapers on the sides with the curve of the bow, and is semi-circular at the forward end), 5 feet 6 inches ; height at forward end, 5 inches ; at after end, 17 inches ; head room in cabin, forward, 3 feet 2 inches ; aft, 4 feet 3 inches (these are the heights at the sides of the cabin, but these are increased several inches in the centre, because of the curve of the top of the cabin) ; height of washboards around cockpit, 9 inches ; diameter of hatch, 18 inches.

The contract price for the "Scoter" was \$1,850, but this did not include certain equipments, etc., which brought the cost, when ready for service, to about \$2,100.

The Work. — As will be seen in the tabulated statements in the Appendix, 169 arrests have been made, and fines amounting to \$2,240 have been imposed by the courts. Three of these arrests were made by local officers, which leaves 166 arrests made by the deputies of the commission. This is a larger number than have been brought before the courts in any other year for some time, and is a most creditable showing for the deputies, in view of the small number of paid officials, the lateness of some of the appointments, the late date at which the "Scoter" was available, and the many other duties with which the men were charged. The fines resulting from the work of our deputies amounted to \$1,915. This excludes a fine of \$50, for the non-payment of which the party convicted was sent to jail for three months ; and it also excludes fines imposed by the lower courts which were not reimposed by the higher courts, before which the cases went on appeal ; also fines secured by local officers.



THE LAUNCH "SCOTER," RUNNING DOWN BOSTON HARBOR AT FULL SPEED.

The large number of cases that were placed on file after conviction had been secured, — of which there were 26, or about 19 per cent. of the convictions obtained by the deputies of the commission, — and the extreme leniency of the courts in imposing fines in some other instances, or the discharge of law-breakers who pleaded guilty, cannot escape the attention of those interested in these matters, especially if they are familiar with the penalties imposed by law. This would be more apparent if the tabulated statement could easily be made to show how small a fraction of the extreme penalty has been imposed in some of the lobster cases, amounting in some instances to only 3 to 10 per cent. of the possible maximum. Light fines for shooting insectivorous birds have also been imposed in some cases.

Whether this leniency is wise or not, is a matter for public consideration. It is our duty to make the arrests and to take parties guilty of violating fish and game laws before the courts; the responsibility thereafter lies with the courts.

The following brief and forcible expression from the highest authority clearly presents the respective responsibilities of the people, officials and the courts in the suppression of lawlessness: —

Remember that in popular government we must rely on the people themselves, alike for the punishment and the reformation. Those upon whom our institutions cast the initial duty of bringing malefactors to the bar of justice must be diligent in its discharge; yet in the last resort the success of their efforts . . . must depend upon the attitude of the courts.*

At an earlier date the same exalted personage spoke the following words, which deserve the candid consideration of every right-thinking citizen, and especially of sportsmen; for they have a particular application to the enforcement of the fish and game laws, — laws which cannot be ignored without danger to the State: —

Ours is a government of liberty, by, through and under the law. Lawlessness and connivance at law-breaking — whether the law-

* Extract from speech of President Roosevelt, reported in the Boston "Herald," Oct. 16, 1903.

breaking take the form of a crime of greed and cunning, or of a crime of violence — are destructive, not only of order, but of the true liberties which can only come through order. If alive to their true interests, rich and poor alike will set their faces like flint against the spirit which seeks personal advantage by overriding the laws. . . . We ask no man's permission when we require him to obey the law, — neither the permission of the poor man nor yet of the rich man.*

There is a temptation to discuss the law-enforcing work in some detail, for it has many elements of interest; but lack of time and space forbids anything beyond brief reference to the most important facts. .

It is gratifying to learn, from one who has travelled extensively in the State, that "There never was a time when better feeling existed among the public in general than now in regard to the observation of the fish and game laws." This kindly feeling has been evident in many ways, but perhaps no more forcibly than by the voluntary prosecution of fish and game cases before the courts by attorneys or others eminent in the law, even when this had to be done at some personal sacrifice. Deputy George M. Poland of Wakefield, recently elected a Representative, who has a law office in Boston, conducted the prosecution in an important deer case without charge to the State, and has offered his services free in any fish and game case. Hon. George D. Storrs of Ware, who is an associate justice, also one of the selectmen of the town as well as one of the most prominent lawyers of the section in which he lives, recently volunteered to prosecute an important case without charge; as a result, the case was won, and a notorious poacher was punished.

Examples of public spirit of this kind are worthy of all praise, for they exhibit a high purpose to secure a proper observance of law, and to benefit the State without personal gain.

The attention of the commission has been invited to many cases where deer have been found dead, wounded, or in cities. Several cases have been put into court, where the evidence warranted a belief of illegal killing or pursuit of deer; and prompt

* Extract from speech of President Roosevelt, reported in the Boston "Herald," Sept. 8, 1903.

attention has been given whenever notice has been received of the presence of a deer in a city, and the animal has been liberated in the woods at the earliest time practicable.

It seems almost beyond belief that an animal so shy as a wild deer should by any chance be in the streets of Chelsea, almost within the shadow of the gilded dome of the State House, or be racing along the thoroughfares of the University city, just across the Charles River from Boston, and within almost a stone's throw of Harvard College; yet it is true.

It follows, as a matter of course, that a considerable number of deer are accidentally killed by trains, by electric cars and by other means; also that others are drowned, or are run to death by dogs. Undoubtedly some are illegally shot, but cases of this kind are few, and the difficulty of obtaining evidence sufficient to secure conviction is generally insurmountable. Every case that has come to our knowledge has been promptly investigated, whether it was one of accident, supposed illegal hunting or otherwise; and frequent post-mortem examinations have been made, to ascertain if any evidence of foul play could be found. In every instance every clue has been followed out so far as practicable, if there was any reasonable ground for suspicion of illegal acts.

Six cases were taken before the courts by our deputies, as shown in the tabulated statement. In two of these cases convictions were secured, but the cases were filed; in another case the defendant was convicted in the lower court, appealed, and was discharged in the higher court; and in the other three cases the defendants were discharged.

Although there is yet more chasing of deer by dogs than there ought to be, there is much less than formerly. Many owners of dogs, knowing that a dog is liable to be shot if found chasing a deer, and also that the dog's owner may be fined, take more care than heretofore to keep their dogs at home under restraint. The law is having a good effect; it is hoped the results will be more widely felt each year.

The new law, prohibiting the use of powder, dynamite and other explosives in fishing waters, was not enacted too soon. Aside from the reprehensible actions of poachers, there has recently developed a practice of furnishing amusement at

summer resorts by having so-called mimic naval battles. For this purpose quantities of explosives are used in ponds and in littoral waters at the sea shore. The places selected have been fishing waters. In each case of which we have learned, a warning from our deputies has been sufficient to secure prompt compliance with the law.

We have about one hundred and seventy-five unsalaried deputies scattered throughout the State, and these gentlemen have a good opportunity to observe what is going on in relation to fish and game, with special reference to the observance of law. The nearly universal testimony of these deputies is to the effect that the practice of Sunday hunting, once prosecuted with absolute indifference to law, has now been nearly abandoned. It would be feasible to quote many statements to this effect from the annual reports of deputies. Of course there are those who are reckless of law, who still venture to hunt on Sunday; but the chance of being haled into court for this offence is great, and the activities of the deputies are sufficient to keep lawlessly inclined persons "guessing" as to when or where they will appear, — all of which has a restraining influence upon would-be Sunday hunters. With few exceptions, the unpaid men, as well as the salaried deputies, are in the covers on Sunday, hence there is greater chance of detecting violations of this law than of any other. This probably accounts for the alleged better enforcement of this law. As it was, forty arrests were made for Sunday hunting, although in some cases this violation was associated with some other, such as ferreting.

There are still those who are ignorant of the fact that the courts and the Attorney-General have decided that the enforcement of the prohibitory Sunday fishing law (section 12, chapter 98, Revised Laws) is not properly incumbent upon this commission, but that the responsibility for its enforcement lies with the local police. Therefore we have been held responsible for the non-enforcement of this Sunday law, although it is no more our duty to enforce it than to enforce other laws for the better observance of the Lord's Day, which are not, strictly speaking, fish and game laws.

Snaring partridges is apparently a thing of the past, except

so far as it is allowed by law. In view of the extreme scarcity of this species, no one should be privileged to snare partridges, at least for a term of years. Deputy W. W. Nixon says:—

I have not found any snares this fall, although I have searched the woods in localities where they have been set in former years. I think this practice is nearly if not wholly stopped.

Many similar statements could be quoted, but they would be only cumulative evidence.

Eleven persons have been convicted for shooting or catching song or insectivorous birds. In one other case a party was arrested for hunting on Sunday who was believed to have been shooting small birds. Nearly all violations of this kind are committed by Italians. Deputy Nixon says:—

The worst violator of the fish and game laws whom we have to contend with is the Italian, who shoots everything that wears fur or feathers. These people are dangerous parties to meet in the woods, with a loaded gun in their hands; and an officer takes his life in his hands when attempting to arrest any of them.

The difficulty of dealing with this class is materially enhanced by the lack of a search law, and the danger is increased because no action has been taken to penalize those who have threatened to shoot the deputies while in the performance of their duty. The following extract, from a Malden despatch of November 9, published in the Boston "Advertiser" of Nov. 10, 1903, will show conclusively that the statement made by Deputy Nixon is based on something more substantial than mere fancy:—

While Policeman Davis was attempting to arrest two Italians whom he had found hunting for birds in the Middlesex Fells reservation to-day, one of the Italians fired at the officer, riddling his clothing and filling his face with birdshot. Davis's wounds are not considered serious. The man who fired the shot escaped.

It is somewhat remarkable that this occurrence took place only four or five days after an Italian pointed his gun at Deputy Burney, and threatened to shoot him if he (Burney) persisted in an attempt to arrest him. At that time Deputy Nixon held

another who had been taken. In this case the arrest was promptly made; a charge of assault as well as of shooting small birds was put before the court; but the party was fined only for killing birds. This is one of several cases where parties have been discharged for assault on deputies, or the case was filed.

The arrests made indicate a wide-spread disposition on the part of the lawlessly inclined to indulge in illegal fishing, including fishing in closed ponds and brooks. There were fifty-seven cases of this kind. These do not include the cases relating to the possession, sale or attempted sale of short trout, trout out of season, etc., of which there were seven, nor do they include lobster cases, of which there were twelve. This makes an aggregate of seventy-six cases, or nearly one-half of the whole, for violations of the fishing laws.

Regarding the enforcement of the lobster laws, the effect has not been so much in the number as in the character of the arrests, and also in the dread of the "Scoter." Some of those who heretofore could pursue their nefarious practice of selling illegal lobsters, almost with impunity, have found it unprofitable to continue in the trade since her advent. Although they might escape capture by hurriedly dumping overboard their illegal lobsters, the frequent compulsory repetition of this disposition of the stock in trade, together with the imminent danger of being caught red-handed and haled into court, has had a discouraging influence on the poachers. It has been claimed that the work of the "Scoter" in repressing violations of fish and game laws along the coast has been as effective as that of two hundred deputies could be without a boat. This is probably an extravagant estimate, but it is the opinion of one who knows what this work has been.

As an instance of the way in which the work is carried on, the following may be related:—

One of the deputies was with a party at Gloucester on a Saturday afternoon, and assisted in making two arrests for having illegal lobsters in possession, the points where these arrests were made being widely separated. He attended court Monday, when the cases were tried. Monday afternoon he reported at headquarters in Boston. Tuesday forenoon he

arrested a man in Fall River for having short lobsters, and secured his conviction. In the afternoon of the same day, with the assistance of an unpaid deputy, he arrested six men for fishing in a closed pond. As soon as the court had disposed of these cases, he went to New Bedford and arrested a man for having tern's eggs in possession, contrary to law; conviction was promptly secured, with a fine. Saturday afternoon the deputy was again in Gloucester, and assisted in making two more important arrests for having illegal lobsters in possession; and the same evening, he, with other deputies who were at Gloucester with him, went to Newburyport; they were out bright and early the next morning to watch for Sunday gunners.

On one occasion a party of deputies drove twelve or fourteen miles in a carriage in the darkness and chill of an early autumn morning, to get to a place on the sea shore where it was suspected Sunday hunting was prosecuted. Several were arrested. Among these were two men who were off on the water shooting from a boat. Securing a light skiff, two of the deputies put off after them. Because of a signal, or for some other reason, the shooters suspected those in the skiff were officers of the law, therefore they pulled toward an inlet, across the mouth of which was a shallow bar. The sea was breaking over the bar so heavily that the hunters felt the men in the skiff, who were in hot pursuit, would not dare to venture into the swirl of boiling foam in their frail boat, although the risk for the larger and more buoyant craft was not so great. Therefore, expecting thus to escape easily, the hunters went over the bar on the crest of a wave. But one of the deputies was from Gloucester, and he had a knowledge of boats and boating. Without hesitation the skiff went into and through the breakers, the pursued were captured, and they had to endure the chagrin of being compelled to pull back again over the bar to a point where a satisfactory landing could be made. Conviction followed.

These instances are only two of many that could be related; but they will probably suffice, as side lights, to show how the work is done, and with what zeal and disregard of personal comfort the deputies have performed their duties.

Ferretting is still practised to some extent, and it will be practically impossible to stop it as long as there is no search law. Nine arrests have been made for ferretting, and the convictions which have followed have had a good effect.

Other arrests have been made for various offences, so that the work has covered nearly the widest possible range of effort. That the effect has been good is beyond question, but it is certain that nothing less than a continuous vigorous effort will suffice to keep the lawless in check. So far as the enforcement of the laws relating to coast fishing and hunting is concerned, it may as well be conceded that it is practically impossible to enforce them thoroughly without larger provision than we now have. The "Scoter" can do a lot of work, but it is simply absurd to expect a single launch to cover the entire coast line at the same time. It will require several such boats to patrol the coast effectively, and to adequately enforce all the laws which relate to fishing and hunting along our shores.

It has been alleged that certain parties have raised pheasants, liberated them, — presumably on their own land, — and then shot them by the wholesale. This has been done, it is alleged, because of the mistaken opinion that it was legal to do it, — an opinion credited to legal authority. In order to prevent a repetition of this, through any misapprehension of the correct meaning of the law, we have secured the following decision from the Honorable Attorney-General of the Commonwealth : —

OFFICE OF THE ATTORNEY-GENERAL,
BOSTON, Dec. 8, 1903.

Capt. J. W. COLLINS, *Chairman, Department of Fisheries and Game.*

DEAR SIR : — The Commissioners on Fisheries and Game desire the opinion of the Attorney-General upon the question whether it is lawful for persons who have raised, bred or purchased live pheasants to take or kill the same, or have them in possession for any other purpose than that of propagation.

R. L., c. 92, § 16, provides : "Whoever, prior to the thirteenth day of February in the year nineteen hundred and five, takes, kills or has in his possession, except for the purpose of propagation, a Mongolian, English or golden pheasant, shall be punished by a fine of twenty dollars for each bird."

I am further informed that certain persons have hunted and shot pheasants, claiming the right to do so upon the ground that the birds

had been raised or bred by them, or their friends, who permitted or authorized such hunting and shooting.

I am of the opinion, however, that such taking or killing of birds described in the statute is in violation of its terms, and I am of opinion that conviction must follow, upon proof of the facts stated. It is evident that the only purpose for which one may take or have in captivity pheasants of the species named is for propagation; and it surely cannot be contended that one can kill for that purpose.

The act apparently contemplates the keeping of pheasants for the purposes of breeding, and in strict captivity. If the birds be hunted and killed, as stated in the facts, while at large and beyond the control and possession of the person who alleges ownership in them, even if upon his own land, the killing is, nevertheless, in my judgment, a violation of the law.

I am very truly yours,

HERBERT PARKER, *Attorney-General*.

Another matter which has provoked much difference of opinion is the correct interpretation of that sentence of section 26, chapter 91, Revised Laws, as revised by chapter 294, Acts of 1903, which says: "And the use of more than ten hooks by one person shall be deemed a trawl within the meaning of this section."

While high legal authority have correctly held that the ordinary meaning of the word "trawl" is a matter of no special moment in this connection, since the Legislature, with the approval of the Governor, has the undoubted constitutional right to make any application of the word it chooses, within the meaning of a certain act, others have held, so it is alleged, that one could legally use as many hooks as he chooses for ice fishing, for the reason that hooks attached to "tip-ups" cannot constitute a trawl. The following decision of the Attorney-General settles this question:—

OFFICE OF THE ATTORNEY-GENERAL,
BOSTON, Dec. 31, 1903.

Capt J. W. COLLINS, *Chairman, Department of Fisheries and Game*.

DEAR SIR:—The Fish and Game Commission desire the opinion of the Attorney-General upon the construction of St. 1903, c. 294, amending R. L., c. 91, § 26, which is as follows: "Whoever draws, sets, stretches or uses a drag net, set net, purse net, seine or trawl in any pond, or aids in so doing, shall be punished by a fine of not less

than twenty nor more than fifty dollars; and the use of more than ten hooks by one person shall be deemed a trawl within the meaning of this section. No floating devices shall be used in connection with such trawls. The provisions of this section shall not affect the rights of riparian proprietors of ponds mentioned in section twenty-three or the corporate rights of any fishing company."

Without, for the moment, referring to the attitude assumed, or the opinions formed, or action taken by or in behalf of the Fish Commission, I confine myself to a consideration of what appears to me to be the true construction of the act quoted.

While I entertain no doubt that the Legislature may prescribe the legal definitions of its own language, I yet hold to the opinion that the act must, if possible, be so construed as to give to the descriptive words therein used the signification generally and commonly attached to them; and it is not to be presumed that the Legislature intended to attach a meaning inconsistent with that generally adopted, unless such intent conclusively appears in the phrase of the act under consideration.

It is to be noted that the act refers to the drawing, setting, stretching or using of a drag net, set net, purse net, seine or trawl. The use of the specific words "drag net," "set net," "purse net" and "seine," seems to be intended to cover, under those designations, all those specific devices or appliances that might otherwise be included within the generic word "trawl," which word has also a specific meaning; and I think it must be held from the context that the Legislature intended to use the word "trawl," in connection with "hooks," in its specific rather than its general sense. A trawl, as such, I understand to be, according to its generally accepted meaning or definition, a line of any length to which is attached a series of shorter lines, upon which hooks are set, such trawl being necessarily a single continuous appliance, used either from the hand or set and overhauled from time to time.

The portion of the section using the words to which I have referred does not require, and, in my opinion, does not even suggest, that the Legislature intended to characterize, in violation of all accepted definitions of the term, as a trawl a number of lines to each of which is attached a single hook, and which lines are independent of each other and in no wise connected. The construction which would make the use of more than ten independent lines with single hooks a violation of the statute, because declared to be a trawl, must, in my opinion, depend entirely upon the clause, "and the use of more than ten hooks by one person shall be deemed a trawl within the meaning of this section." But this clause must be read in connection with the context of the act; and I cannot bring myself to believe that the Legislature meant to say that ten independent lines were lawful, and did not con-

stitute a trawl, but that eleven such lines used by any one person should constitute a trawl.

And, further, I am of opinion that the Legislature may have intended—and when we are seeking for intent, we must seek for a reasonable intent—to prohibit the use of a single line to which should be attached more than ten hooks; and that the evil intended to be prevented by the act was the use of set lines employing more than ten hooks; and that the limitation to the number ten was due to a consideration of the fact that spoon hooks, so called, or gang hooks, used with rod and line, were recognized as legitimate sporting devices, with which the Legislature did not intend to interfere.

I have thus intimated to you what, entirely independent of any other opinions which have come to my knowledge, appears to me to be a reasonable construction of the act; and such a construction as I am inclined to think the court of last appeal would adopt, since it is a construction that does not involve the violent assumption that the Legislature, by indirect phrase, intended to put an entirely new and unprecedented signification upon a word already having a generally adopted and understood meaning.

It is obvious that a construction different from that which I have suggested may be put upon this act, and it may be held that the phrase, “the use of more than ten hooks by one person shall be deemed a trawl,” ought to be held to mean that more than ten independent lines are collectively to be held, within the meaning of the act, to be a trawl; but I incline to believe that the suggestions that I have first made are the more natural and reasonable ones, and suggest that line of construction most consistent with the principles and rules of law invoked where the question of construction is doubtful or complex.

I believe that if the Legislature had intended specifically to prohibit the use of several independent lines, as ordinarily employed in fishing through the ice, they would have so stated.

I am not much enlightened or aided in my attempt to correctly construe this somewhat doubtful act by the sentence, “No floating devices shall be used in connection with such trawls,” except that this specific provision with regard to floating devices to me seems to indicate that traps or appliances such as are used in ice fishing would have also been specifically mentioned, had this form of fishing been the object of the prohibitive legislation.

I would further suggest that the prohibition against floating devices used in connection with such trawls seems to indicate that the trawl in the legislative mind was the trawl commonly known as such; and that the Legislature did not intend entirely to prohibit the use of trawls, but only to prohibit the application of any floating device thereto.

I may add, rather apart from the legitimate scope of a legal opinion, that, as laws in restraint of fishing or fowling or the taking of wild game are rather impatiently received by the general public, legislation along these lines should be very explicit, and carefully phrased; and that prosecutions instituted upon a strained or possibly untenable construction of an act impair the very purposes of legitimate legislation.

Yours very truly,

HERBERT PARKER, *Attorney-General*.

NEW LEGISLATION.

We recommend the following changes in the fish and game laws:—

We recommend the enactment of the following laws, which the delegates from the lobster-producing States, who attended the convention held September 23 and 24 at the State House, voted to recommend to their respective Legislatures:— *

(1) All lobsters or parts of lobsters sold for use in this state, or for export therefrom, must be sold and delivered in the shell, under a penalty of twenty dollars for each offence; and whoever ships, buys, sells, gives away or exposes for sale lobster meat after the same shall have been taken from the shell, shall be liable to a penalty of one dollar for each pound of meat so bought, sold, exposed for sale, given away or shipped. Any person or corporation in the business of a common carrier of merchandise, who shall knowingly carry or transport from place to place lobster meat after the same shall have been taken from the shell, shall be liable to a penalty of fifty dollars upon each conviction thereof. All lobster meat so illegally bought, shipped, sold, given away, exposed for sale or transported, shall be liable for seizure, and may be confiscated. Nothing contained herein shall be held to prohibit the sale of lobsters that are legally canned and hermetically sealed.

(2) No person or corporation shall engage in the lobster fishery in this state without a permit from the fish and game commissioners, which permit shall be furnished free of cost to the applicant, and shall contain a copy of the laws for the protection of the lobster. Any person who engages in lobster fishing without a permit from the fish and game commission shall forfeit not less than one hundred

* This does not fully apply to Maine, which already has in operation the law prohibiting the sale of lobster meat except in the shell, and there it has been found to work very satisfactorily. It is unquestionably one of the most effective laws for the protection of the lobster that has ever been enacted.

dollars, or be liable to imprisonment, or both fine and imprisonment, in the discretion of the court.

A person holding a permit, who is convicted of a violation of any of the lobster laws, shall surrender his permit to the fish and game commission, and it shall not be reissued within one year from the date of its surrender. Failure to surrender a permit will make the holder liable to a penalty of not less than fifty dollars, and the confiscation of the pots and boats used by him for lobster fishing.

We recommend that section 9, chapter 91, Revised Laws, be revised by adding, after the word “maintained,” the words “or where in their judgment fishways are needed, and they;” by adding, after the word “rivers,” the words “or whether in their judgment a fishway is needed for the passage of fish over any dam;” and adding, after the word “therein,” the words “and where, how and when a new fishway must be built,”—so that the section shall read as follows:—

SECTION 9. The commissioners may examine all dams upon rivers where the law requires fishways to be maintained, or where in their judgment fishways are needed; and they shall determine whether the fishways, if any, are suitable and sufficient for the passage of the fish in such rivers, or whether in their judgment a fishway is needed for the passage of fish over any dam; and shall prescribe by an order in writing what changes or repairs, if any, shall be made therein, and where, how and when a new fishway must be built, and at what times the same shall be kept open, and shall give notice to the owners of the dams accordingly. The supreme judicial court or the superior court shall, upon the petition of the commissioners, have jurisdiction in equity or otherwise to enforce any order made in accordance with the provisions of this section, and to restrain any violation of such order.

We recommend the amendment of section 68, chapter 91, Revised Laws, by adding after the last word in the section the following words: “Notice of the acceptance of the provisions of this section by any town shall be sent to the fish and game commission by the clerk of such town. Neglect or refusal to send such notification within thirty days after the passage of this act, or the acceptance of the provisions of this section, shall subject the town clerk to a fine of ten dollars”,—so that the section shall read as follows:—

SECTION 68. Whoever takes or captures pickerel in a river, stream or pond, in a town which accepts the provisions of this section or has accepted the corresponding provisions of earlier laws, in any other manner than by naturally or artificially baited hook and hand line, shall forfeit one dollar for every pickerel so taken, if proceedings therefor are commenced within sixty days after the time of committing the offence. Notice of the acceptance of the provisions of this section by any town shall be sent to the fish and game commission by the clerk of such town. Neglect or refusal to send such notification within thirty days after the passage of this act, or the acceptance of the provisions of this section, shall subject the town clerk to a fine of ten dollars.

We recommend the amendment of section 12, chapter 92, Revised Laws, by taking therefrom the words “ruffed grouse, commonly called partridge, or,”—so that the section shall read as follows :—

SECTION 12. The provisions of the preceding section shall not apply to the trapping or snaring of hares or rabbits upon his land by an owner of land, or by a member of his family if authorized by him, between the first day of October and the first day of December.

We recommend the enactment of a search law, as follows :—

SECTION 1. Any commissioner on fisheries and game, deputy commissioner on fisheries and game, member of the district police, or officer qualified to serve criminal process, may, with or without a warrant, search any boat, car, box, locker, crate or package, and any building, where he has reason to believe any game or fish taken or held in violation of law is to be found, and may seize any game or fish so taken or held, and any game or fish so taken or held shall be forfeited: *provided, however,* that this section shall not authorize entering a dwelling house, or apply to game or fish which is passing through this Commonwealth under authority of the laws of the United States.

SECTION 2. A court of justice authorized to issue warrants in criminal cases shall, upon complaint under oath that the complainant believes that any game or fish unlawfully taken or held is concealed in a particular place, other than a dwelling house, if satisfied that there is reasonable cause for such belief, issue a warrant to search therefor. The search warrant shall designate and describe the place to be searched and the objects to be searched for, and shall be directed to any officer named in section one of this act, commanding

him to search the place where the game or fish for which he is required to search is believed to be concealed, and to seize such game or fish.

SECTION 3. This act shall take effect upon its passage.

COURTESIES.

The commission has received from the United States Bureau of Fisheries, Department of Commerce and Labor, consignments of eggs of brook and rainbow trout, landlocked salmon and pike perch, also a shipment of shad fry. We have likewise received from the Bureau statements of its fish cultural work in this State, and various of its publications, including monthly statistical statements of the fish landed from fishing vessels at Boston and Gloucester.

Capt. E. E. Hahn, master of the Bureau's schooner "Grampus," generously permitted the chairman to accompany that vessel on a cruise along the coast of Maine.

The post-office authorities and others have permitted the display of posters containing abstracts of the fish and game laws.

The railroads within the State, notably the New York, New Haven & Hartford, the Boston & Albany and the Boston & Maine, have, as formerly, carried free shipments of fish, birds and animals intended for distribution or propagation.

Mr. O. T. Olsen of Grimsby, Eng., has furnished us with important information about the management of an otter trawl; also illustrations of an otter or trawl board, and a plan of a trawl.

We are indebted to Capt. L. D. Baker of Boston, Hon. John H. Casey of Lee, and the Fitchburg Rod and Gun Club, for hospitalities and courtesies.

Mrs. George Westinghouse of Lenox very generously permitted the chairman to go in her electric launch to examine Laurel Lake; and her secretary, Mr. A. G. Uptegraff, managed the launch while the work was being done.

Dr. George W. Field collected valuable information for the commission regarding the cause of death of fish in inland waters, about lobsters, etc., free of charge to the State.

Dr. C. S. Hodge of Clark University, Worcester, has courteously undertaken the study of a disease which has afflicted trout at our Sutton hatchery.

The commission has been privileged to extend courtesies in the following instances:—

To the United States Bureau of Fisheries, permitting the collection of egg-bearing lobsters; the operation of two-pound nets for scientific purposes, etc.

We have continued to assist Mr. W. E. Castle of the Museum of Comparative Zoölogy, at Cambridge, in securing and holding in confinement material necessary for the conduct of special scientific researches. At the close of this year we are attempting to hatch the second generation of trout from a selected series, with the object of establishing certain facts in heredity.

Letters of introduction to prominent citizens in Grimsby and Newcastle, Eng., have been furnished by the chairman to Mr. John R. Neal, a leading fish merchant of Boston.

Deputy Thomas S. Holmes has been authorized to collect lampreys at the Lawrence fishway, to be used for scientific purposes at various institutions of learning.

We have furnished trout eggs and fry to the Mt. Holyoke College for biological research.

Permits have been issued to the following parties to collect birds and eggs for scientific purposes: Robert O. Morris, Springfield; A. C. Bent, Taunton; George H. Mackay, Nantucket; Homer L. Bigelow, Boston; Owen Durfee, Fall River; Dr. J. W. Bailey, Boston; Frederic H. Kennard, Boston; Clarence W. Buckminster, Georgetown; Albert E. Jewett, Clinton; Dr. C. F. Hodge, Worcester; J. Bion Richards, Fall River.

Permits to take sand eels for bait have been issued to the following: Charles F. Lattime, William H. Simmons, William H. Pierce, Joseph Thurlow, Albion P. Hilton, James H. Thurlow, Newburyport; Samuel Kilborn, Samuel S. Bailey, Samuel Bayley, John W. Post, Charles A. Bayley, Charles H. Small, Albert E. Post, John D. Kilborn, Edward E. Wells, Charles P. Rust, Peter Rhodes, John T. Harris, Edward Poole, Samuel A. Hicks, Robert L. Gove, Thomas Roberts, Stephen Caswell, Clarence Leet, Albert H. Leet, J. Lewis Grant, Daniel D. Wells, Ipswich.

J. W. COLLINS.

E. A. BRACKETT.

J. W. DELANO.

APPENDIX.

[A.]

LIST OF COMMISSIONERS.

UNITED STATES BUREAU OF FISHERIES, WASHINGTON, D. C.

George M. Bowers, Commissioner.

Hugh M. Smith, Deputy Commissioner.

Irving H. Dunlap, Chief Clerk.

Barton W. Evermann, Assistant in charge of Division of Inquiry
respecting Food Fishes.

John W. Titcomb, Assistant in charge of Division of Fish Culture.

Alvin B. Alexander, Assistant in charge of Division of Statistics and
Methods of the Fisheries.

Superintendents of United States Fisheries Stations.

Charles G. Atkins, Craig Brook, East Orland, Me.

E. E. Race, Green Lake, Me.

Edgar N. Carter, St. Johnsbury, Vt.

Waldo F. Hubbard, Nashua, N. H.

C. G. Corliss, Gloucester, Mass.

E. F. Locke, Woods Hole, Mass.

L. G. Harron (in charge), Bryan's Point, Md.

John E. Brown (in charge), Central Station, Washington, D. C.

George A. Seagle, Wytheville, Va.

Alexander Jones, Erwin, Tenn.

S. G. Worth, Edenton, N. C.

J. J. Stranahan, Cold Spring, Bullochville, Ga.

Livingstone Stone, Cape Vincent, N. Y.

S. W. Downing, Put-in-Bay, Ohio.

Frank N. Clark, Northville, Mich.

S. P. Wires, Duluth, Minn.

R. S. Johnson, Manchester, Iowa.

Dr. S. P. Bartlett, Quincy, Ill.

H. D. Dean, Neosho, Mo.

John L. Leary, San Marcos, Tex.

DeWitt C. Booth, Spearfish, So. Dak.

E. A. Tulian, Leadville, Col.

James A. Henshall, Bozeman, Mont.

H. H. Buck, Baker Lake, Wash.

J. Nelson Wizner, Clackamas, Ore.

Giles H. Lambson, Baird and Battle Creek, Cal.

R. K. Robinson, White Sulphur, West Va.

D. Trovin, Pratt.

MAINE.

Inland Fish and Game.

L. T. Carleton, Chairman,	.	.	.	.	.	.	Winthrop.
Henry O. Stanley,	.	.	.	.	.	.	Dixfield.
Edgar E. Ring, Secretary,	Orono.

Sea and Shore Fisheries.

A. R. Nickerson,	Boothbay Harbor.
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MARYLAND.

Jesse W. Downey,	New Market.
Clarence L. Vincent,	Snow Hill.

MASSACHUSETTS.

Joseph W. Collins, Chairman,	.	.	.	.	.	.	Boston.
Edward A. Brackett, Secretary,	.	.	.	.	.	.	Winchester.
John W. Delano, Superintendent of Hatcheries,	.	.	.	.	.	.	Marion.
Office, State House, Boston, Mass.							

MICHIGAN.

F. B. Dickerson, President,	.	.	.	.	.	.	Detroit.
George M. Brown, Vice-President,	.	.	.	.	.	.	Saginaw.
George D. Mussey, Secretary,	.	.	.	.	.	.	Detroit.
J. H. Johnson, Treasurer,	.	.	.	.	.	.	Detroit.
Seymour Bower, Superintendent of Hatcheries,	.	.	.	.	.	.	Detroit.
C. D. Joslyn,	.	.	.	.	.	.	Detroit.

MINNESOTA.

Game and Fish Commissioners. (Office at Capitol.)

Uri L. Lamprey, President,	.	.	.	.	.	.	St. Paul.
W. P. Hill, Vice-President,	.	.	.	.	.	.	Fairmont.
D. W. Meeker, Secretary,	.	.	.	.	.	.	Moorhead.
H. G. Smith, Treasurer,	.	.	.	.	.	.	Winona.
S. F. Fullerton, Executive Agent,	.	.	.	.	.	.	St. Paul.

MISSOURI.

Frank P. Yenawine, President,	.	.	.	.	.	.	St. Joseph.
J. H. Zollinger, Vice-President,	.	.	.	.	.	.	Boonville.
Richard Porter, Secretary,	.	.	.	.	.	.	Paris.
John Gable, Jr.,	.	.	.	.	.	.	Browning.

George J. Chapman,	St. Louis.
Phillip Kopplin, Superintendent of Hatcheries,	St. Louis.
M. E. O'Brian,	St. Joseph.

NEBRASKA.

Game and Fish Commission.

Governor, John H. Mickey, ex officio,	Lincoln.
George L. Carter, Chief Deputy,	Lincoln.
W. J. O'Brien, Superintendent of Hatcheries,	South Bend.

NEW HAMPSHIRE.

Nathaniel Wentworth, Chairman,	Hudson Centre.
C. B. Clarke,	Concord.
Merrill Shurtleff,	Lancaster.

NEW JERSEY.

Benjamin P. Morris, President and Treasurer,	Long Branch.
Richard T. Miller,	Camden.
David P. McClellan,	Morristown.
Percy H. Johnson,	Bloomfield.

NEW YORK.

Forest, Fish and Game.

DeWitt C. Middleton, Commissioner,	Watertown.
John D. Whish, Secretary,	Albany.
J. Duncan Lawrence,	Bloomville.
.	Office at Capitol, Albany.

OHIO.

J. L. Rodgers, President,	Columbus.
Paul North,	Cleveland.
D. W. Greene,	Dayton.
George C. Blankner, Secretary,	Columbus.
J. C. Porterfield, Chief Warden,	Columbus.
Thomas B. Paxton,	Cincinnati.
Louis J. Weber,	McConnelsville.

OREGON.

Governor, George E. Chamberlain,	Salem.
Secretary of State, F. I. Dunbar,	Salem.
State Treasurer, C. S. Moore,	Salem.
H. G. VanDusen, Master Fish Warden,	Astoria.

PENNSYLVANIA.

Fisheries Commission.

S. B. Stillwell, President,	. . . . .	Scranton.
W. E. Meehan, Secretary,	. . . . .	Philadelphia.
H. C. Demuth, Treasurer,	. . . . .	Lancaster.
John Hamberger,	. . . . .	Erie.
James W. Correll,	. . . . .	Easton.

Game Commission.

William M. Kennedy, President,	. . . . .	Pittsburgh.
C. K. Sober,	. . . . .	Lewisburg.
James H. Worden,	. . . . .	Harrisburg.
William H. Myers,	. . . . .	Williamsport.
Charles B. Penrose,	. . . . .	Philadelphia.
J. O. H. Denney,	. . . . .	Ligonier.
Joseph Kalbfus, Secretary,	. . . . .	Harrisburg.

RHODE ISLAND.

Henry T. Root, President, Treasurer and Auditor,	. . . . .	Providence.
J. M. K. Southwick, Vice-President,	. . . . .	Newport.
Charles W. Willard,	. . . . .	Westerly.
A. D. Mead, Ph.D., Brown University,	. . . . .	Providence.
William P. Morton, Secretary,	. . . . .	Providence.
Adelbert D. Roberts,	Woonsocket.
William H. Boardman,	Central Falls.

UTAH.

John Sharp,	Salt Lake City.
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VERMONT.

H. G. Thomas,	Stowe.
E. A. Davis,	Bethel.

VIRGINIA.

John W. Bowdoin, Chairman,	Bloxom.
Seth F. Miller, Secretary,	. . . . .	Foster.
George B. Keezell,	. . . . .	Keezelltown.
Henry M. Tyler,	. . . . .	Richmond.
Robert J. Camp,	. . . . .	Franklin.

WASHINGTON.

Governor, Henry McBride,	. . . . .	Olympia.
State Treasurer, C. W. Maynard,	. . . . .	Olympia.
T. R. Kershaw, Commissioner,	. . . . .	Whatcom.

WISCONSIN.

Governor, Robert M. LaFollette, ex officio,	.	.	.	Madison.
Edwin E. Bryant, President,	.	.	.	Madison.
William J. Starr,	.	.	.	Eau Claire.
Calvert Spensely, Treasurer,	.	.	.	Mineral Point.
James J. Hogan,	.	.	.	La Crosse.
Henry D. Smith,	.	.	.	Appleton.
Currie G. Bell,	.	.	.	Bayfield.
Edward A. Birge, ex officio, Professor of Zoölogy, Uni-				
versity of Wisconsin, Secretary,	.	.	.	Madison.
James Nevin, Superintendent,	.	.	.	Madison.

WYOMING.

D. C. Nowlin, State Game Warden,	.	.	.	Lander.
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DISTRIBUTION OF FOOD FISH.

BROOK TROUT.

Fry distributed from the Sutton Hatchery during the Months of April and May, 1903.

APPLICANTS.	Name of Brook.	Town.	Number.
C. V. Dudley,	Prentice,	Northbridge,	5,000
H. W. Barnes,	Burt,	Northbridge,	5,000
George L. Gill,	Carpenter,	Northbridge,	5,000
George Pogue,	Misco and Cold Spring,	Grafton,	10,000
H. H. Adams,	Adams,	Grafton,	5,000
Frank Vinton,	Crosby,	Grafton,	5,000
F. H. Clapp,	Chamberlain,	North Grafton,	5,000
George B. Allen,	Carroll,	North Grafton,	5,000
Albert Hatch,	Nurse,	North Grafton,	5,000
E. A. Brigham,	Crosby,	North Grafton,	5,000
H. C. Puffer,	Higher,	Springfield,	10,000
R. R. Andrews,	Hollister,	Westfield,	5,000
H. R. Stiles,	Timber Swamp,	Westfield,	5,000
W. S. Marsh,	Slab,	Westfield,	5,000
L. H. Bowers,	Powder Mill,	Westfield,	5,000
G. R. Bowers,	White,	Westfield,	5,000
C. A. Pierce,	Mums,	Westfield,	5,000
H. F. Snow,	Oak Orchard,	Westfield,	5,000
R. L. Soper,	Powders Hollow,	Westfield,	5,000
Alfred Read,	Little River,	Westfield,	5,000
W. J. Morton,	Jacks,	Westfield,	5,000
A. W. Hitchcock,	Cold Spring,	Westfield,	5,000
W. A. Soper,	Great,	Westfield,	5,000
C. W. Goodwin,	Allen and Beeman,	West Brookfield,	10,000
P. S. Callahan,	Lead Mine,	Southbridge,	5,000
J. P. Love,	Brown and Pot Ash,	Webster,	10,000
J. P. Kelley,	Cold Spring,	Uxbridge,	5,000
John H. Hagburg,	Flags,	Boylston,	10,000
C. N. Hargraves,	Johnson,	Framingham,	10,000
O. F. Fuller,	Fox and Wallis,	Blackstone,	10,000
Harry Clark,	Ironstone,	Blackstone,	5,000
L. G. McKnight,	French,	Gardner,	5,000
William Pratt,	Mosquito,	Gardner,	5,000
Albert J. Ray,	Moors,	Westminster,	5,000
W. H. Frost,	Ellenwood,	Athol,	5,000
W. H. Frost,	Popple Camp,	Phillipston,	5,000
W. H. Frost,	Brigham,	Royalston,	5,000
W. H. Emerson,	Browns and Streeter,	East Douglas,	15,000
Clarence M. Wood,	Kenney, Morss and Westfield,	Chester,	15,000
William L. Lincoln,	Ware and Crouch,	Paxton,	10,000
W. D. Lepper,	Jerico,	Marlborough,	5,000
William J. Cox,	Stone,	Marlborough,	5,000
H. C. Hudson,	Lovetts,	Marlborough,	5,000
F. M. Ellis,	Bigelow,	Marlborough,	5,000
W. M. Brigham,	Parmenter,	Marlborough,	5,000
C. L. Allen,	Barber,	Worcester,	5,000
			290,000

Fry distributed from the Winchester Hatchery during the Months of April and May, 1903.

APPLICANTS.	Name of Brook.	Town.	Number.
C. W. & F. W. Ames,	Boutwell and Keyes,	Woburn,	8,000
John H. Garvey,	Bennett,	Woburn,	4,000
D. P. Carney,	High,	Woburn,	4,000
E. E. Wood,	Heath,	Woburn,	4,000
William A. Lang,	Spaulding,	Lowell,	4,000
H. E. Richardson,	Keyes,	Lowell,	4,000
Frank E. Shaw,	Clover,	Lowell,	4,000
G. L. Huntoon,	Double,	Lowell,	4,000
Caleb L. Smith,	Blind,	Chelmsford,	4,000
G. W. Alcott,	Black,	Chelmsford,	4,000
W. H. Redman,	Hazeno,	Chelmsford,	4,000
W. E. Badger,	Richardson,	Dracut,	4,000
B. C. Morrisson,	Heath,	Tewksbury,	4,000
Abram E. Brown,	Elm and Smith,	Bedford,	8,000
John Saunders,	Stoney,	Andover,	4,000
Charles M. Kimball,	Houghtons and Rocky,	Acton,	8,000
Charles M. Kimball,	Taylor's and Cemetery,	South Acton,	12,000
L. J. Knowlton,	Stoney,	Rockport,	4,000
C. P. Abbott,	Morrills,	Groveland,	4,000
H. W. Longfellow,	Pem,	Georgetown,	4,000
Harry L. Brown,	Poor,	Georgetown,	4,000
R. B. Robinson,	Town Farm,	Georgetown,	4,000
Charles A. Lunt,	Tanhouse and Batchelder,	Rowley,	8,000
Claude Tarbox,	Wheeler,	Rowley,	4,000
Moody Kimball,	Smallpox,	Salisbury,	4,000
William H. Leonard,	Rumford,	East Foxborough,	4,000
Dwight F. Lane,	Pine Swamp,	Dighton,	4,000
James F. Pane,	Cedar,	Dighton,	4,000
N. H. Wood,	Tuckers,	East Norton,	4,000
W. H. Edgerly,	Town River,	West Bridgewater,	4,000
William A. Andrews,	Raven,	Middleborough,	4,000
C. H. Norwell,	South,	Reading,	4,000
A. E. Roberts,	North,	Reading,	4,000
C. A. Currier,	Shaker Glen,	Lexington,	4,000
H. M. Munroe,	Trout,	Lexington,	4,000
A. S. Mitchell,	Browns,	Lexington,	4,000
A. B. Clark,	Hodgdon,	Peabody,	4,000
C. A. Wiggin,	Goldthwait,	Peabody,	4,000
J. L. Buffington,	Shingle Island,	Fall River,	4,000
J. G. Blaisdell,	Cornell,	Fall River,	4,000
J. M. Morton,	Mothers,	Fall River,	4,000
John W. Holmes,	Lyon,	Fall River,	4,000
Nathan D. Chase,	Terry,	Fall River,	4,000
A. H. Gardner,	Collins,	Freetown,	4,000
N. B. Everett,	Bread and Cheese,	Westport,	4,000
Dana C. Everett,	Ledge,	Assonet,	4,000
			208,000

Fry distributed from the Hadley Hatchery during the Months of April and May, 1903.

F. E. White,	Leaping Well Reservoir,	South Hadley,	5,000
S. E. Bliss,	Leaping Well,	South Hadley,	5,000
F. M. Smith,	Elmer,	South Hadley,	5,000
T. F. Buckley,	Buttery,	South Hadley,	5,000
B. C. Brainard,	Kellogg,	Granby,	5,000
M. F. McGrath,	McGrath,	Granby,	10,000
George Hoffman,	Goepel,	Granby,	5,000
George M. Prentice,	Days,	Holyoke,	20,000
A. D. Moore,	Biebee,	Chicopee Falls,	20,000
Edward Miller,	Parsons,	Northampton,	5,000
L. H. Porter,	Broad,	Northampton,	5,000
William G. Nichols,	Loudville River (brown trout),	Northampton,	10,000
Harry Hill,	Turkey Hill,	Westhampton,	5,000
Thomas F. Ahearn,	Ahearn,	Sunderland,	5,000
George F. Buckner,	Broad,	Easthampton,	10,000

Hadley Hatchery—Concluded.

APPLICANTS.	Name of Brook.	Town.	Number.
F. S. Isbell,	Hannun,	Easthampton, . .	10,000
W. H. Thayer, . . .	Bullard and Nash, . . .	Williamsburg, . .	10,000
F. L. Bisbee,	Meekins,	Williamsburg, . .	10,000
M. L. Bradford, . . .	Running Gutter, . . .	Hatfield,	10,000
John F. Luman, . . .	King and Hartwell, . . .	Palmer,	10,000
R. C. Newell,	Hillside and Mahoney, . . .	Palmer,	10,000
D. F. Hartnett, . . .	Loftus and Lawler, . . .	Palmer,	10,000
			190,000

Fry distributed from the Adams Hatchery during the Months of April and May, 1903.

Sanborn G. Tenney, . . .	Treadwell Hollow, . . .	Williamstown, . .	10,000
E. W. Blackinton, . . .	New Ashford,	Williamstown, . .	5,000
E. H. Pratt,	McNamara,	North Adams, . .	5,000
W. F. Darby,	Green River,	Hancock,	5,000
J. W. Thompson, . . .	Ballou,	Adams,	5,000
H. J. Sheldon,	Chapman,	Adams,	5,000
F. I. Wilder,	Bowen,	Adams,	5,000
William P. Martin, . . .	Fisk,	Adams,	5,000
F. L. Snow,	Patton,	Adams,	5,000
E. J. Noble,	Tophet,	Adams,	5,000
George F. Sayles, . . .	Gordon,	Cheshire,	5,000
M. A. Bliss,	Gulf,	Savoy,	10,000
G. E. Robinson,	Nos. 1 and 2,	Hinsdale,	10,000
W. E. Clogher,	Daily,	Hinsdale,	10,000
C. M. Drake,	Clark and Cole,	Cummington, . . .	10,000
C. M. Drake,	Shaw and Crosby,	Cummington, . . .	10,000
C. M. Drake,	Warner,	Cummington, . . .	5,000
W. A. Smith,	North Packard,	Goshen,	5,000
W. E. Benjamin,	South Packard,	Goshen,	5,000
H. F. Hubbard,	Rogers,	Goshen,	5,000
M. W. Smith,	Highland,	Goshen,	5,000
Wellington K. Henry, . .	Uncahamet and Brattle, . . .	Pittsfield,	20,000
C. H. Sago,	Dalzele,	South Egremont, . .	10,000
A. A. Shipper,	Shipper,	Rowe,	10,000
John F. Hood,	Dry,	Gill,	10,000
C. H. Russell,	Chapin, Simon and Casey, . . .	Greenfield,	25,000
G. D. Gregory,	Thorp and Reservoir, . . .	Sandisfield,	10,000
G. D. Gregory,	Indian Hill,	Sandisfield,	5,000
			225,000

Fingerling Brook Trout Plants.

C. A. Pierce,	Powder Mill,	Westfield,	2,000
Alfred Read,	White,	Westfield,	
R. K. Andrews,	Sandy Mill,	Westfield,	
L. H. Bowers,	Cold Spring,	Westfield,	
H. P. Moseley,	Powder Hollow,	Westfield,	
R. L. Soper,	Slab,	Westfield,	2,000
C. L. Bush,	Bigelow and Hollow, . . .	North Brookfield, . .	
E. W. Reed,	Harrington,	North Brookfield, . .	
John Mellow,	Mad,	North Brookfield, . .	
C. W. Eggleston,	Webb,	North Brookfield, . .	
E. C. Smith,	West,	North Brookfield, . .	400
E. D. Corbin,	Welch,	North Brookfield, . .	
George S. Ladd,	Freeman,	Warren,	
C. W. Bradford,	Saw-mill,	Warren,	
J. P. Schneider,	Penny and Mill,	Brimfield,	
George W. Sherman, . . .	Shermans,	Brimfield,	400
John F. Luman,	Mahoney,	Palmer,	500
M. Lawlor,	Lawlor,	Palmer,	500
D. F. Hartnett,	Hartnett,	Palmer,	500
Nelson St. John,	King,	Palmer,	500

Fingerling Brook Trout Plants—Continued.

APPLICANTS.	Name of Brook.	Town.	Number.
Everett Flood, . . .	Morgan, . . .	Monson, . . .	400
Leominster Gun Club, . . .	Mononosnock, . . .	Leominster, . . .	2,000
Leominster Gun Club, . . .	Mammoth, . . .	Leominster, . . .	
Leominster Gun Club, . . .	McGoverns, . . .	Lancaster, . . .	
Leominster Gun Club, . . .	Chisel, . . .	Lancaster, . . .	
Leominster Gun Club, . . .	Steam Mill, . . .	Westminster, . . .	
Leominster Gun Club, . . .	Hayward, . . .	Sterling, . . .	
W. F. Darby, . . .	Green River, . . .	Williamstown, . . .	400
S. G. Tenney, . . .	Treadwell, . . .	Williamstown, . . .	600
E. H. Pratt, . . .	Hudson, . . .	North Adams, . . .	400
N. B. Baker, . . .	Hudson, . . .	Clarksburg, . . .	400
William E. Clogher, . . .	Saw-mill, . . .	Hinsdale, . . .	300
C. E. Robinson, . . .	Robinson Farm, . . .	Hinsdale, . . .	300
G. K. Baird, . . .	Greenwater, . . .	Lee, . . .	300
Wellington K. Henry, . . .	Uncahamet, . . .	Pittsfield, . . .	500
W. S. Warren, . . .	May, . . .	Dalton, . . .	1,200
P. H. Clarissey, . . .	Cady, . . .	Dalton, . . .	
F. N. Groesbeck, . . .	Cady, . . .	Dalton, . . .	
W. M. Cooper, . . .	Bartlett, . . .	Dalton, . . .	
M. R. Goddard, . . .	Hubbardston, . . .	Gardner, . . .	
J. S. Ames, . . .	Hubbardston, . . .	Gardner, . . .	
A. E. Knowlton, . . .	Poor Farm, . . .	Gardner, . . .	2,000
William Pratt, . . .	Bailey, . . .	Gardner, . . .	
John F. Sweeney, . . .	Mosquito, . . .	Gardner, . . .	
F. L. Hager, . . .	Crow Hill, . . .	Templeton, . . .	400
C. D. Moulton, . . .	Chase, . . .	Athol, . . .	400
O. W. Wright, . . .	Gale, . . .	Orange, . . .	400
J. E. Stewart, . . .	Bigelow, . . .	Westminster, . . .	1,200
W. W. Young, . . .	Round Meadow, . . .	Westminster, . . .	
E. L. Gilson, . . .	Goodridge, . . .	Westminster, . . .	
O. L. Howlett, . . .	Butterworth, . . .	Holland, . . .	400
P. S. Callahan, . . .	Saw-mill and Bemis, . . .	Southbridge, . . .	800
Dominico Pocal, . . .	Cohasset, . . .	Sturbridge, . . .	400
C. F. Condry, . . .	Cataconamac, . . .	Lunenburg, . . .	400
C. H. Cooke, . . .	Poor Farm, . . .	Lunenburg, . . .	400
Joseph P. Love, . . .	Brown, . . .	Webster, . . .	400
J. P. Kelley, . . .	Cold Spring, . . .	Uxbridge, . . .	400
W. H. Lewis, . . .	Picnic, . . .	Uxbridge, . . .	400
C. V. Dudley, . . .	Purgatory and Burt, . . .	Northbridge, . . .	800
George L. Gill, . . .	Carpenter, . . .	Northbridge, . . .	400
Orrin C. Cook, . . .	Mill Plain, . . .	Hopedale, . . .	400
Harry Clarke, . . .	Ironstone, . . .	Millville, . . .	400
George Pogue, . . .	Misco, . . .	Grafton, . . .	1,200
Frank Vinton, . . .	Cold Spring, . . .	Grafton, . . .	
H. H. Adams, . . .	Adams, . . .	Grafton, . . .	
George B. Allen, . . .	Carroll, . . .	North Grafton, . . .	600
Albert Hatch, . . .	Nurse, . . .	North Grafton, . . .	600
C. N. Hargraves, . . .	Baiting, . . .	South Framingham, . . .	1,200
W. A. Whitman, . . .	Duffer, . . .	South Framingham, . . .	
Frank B. Newton, . . .	Eames, . . .	South Framingham, . . .	
H. P. Andrews, . . .	Hog, . . .	Hudson, . . .	400
C. H. Lasselle, . . .	Sampson, . . .	Bolton, . . .	800
Charles M. Kimball, . . .	Cemetery, . . .	South Acton, . . .	1,200
Charles M. Kimball, . . .	Taylor, . . .	South Acton, . . .	
Charles M. Kimball, . . .	Houghtons, . . .	South Acton, . . .	
W. S. Sheldon, . . .	Willard and Locke, . . .	Ashby, . . .	800
F. J. Piper, . . .	Barberry Hill, . . .	Townsend, . . .	1,200
F. J. Piper, . . .	Pearl Hill, . . .	Townsend, . . .	
F. J. Piper, . . .	Bixby, . . .	Townsend, . . .	
W. A. Kemp, . . .	Noker and Sucker, . . .	Pepperell, . . .	800
J. P. Benedict, . . .	Hunkerty, . . .	Groton, . . .	400
W. D. Lepper, . . .	Bigelow, . . .	Marlborough, . . .	2,000
J. Hazzard, . . .	Bigelow, . . .	Marlborough, . . .	
W. M. Brigham, . . .	Jerico, . . .	Marlborough, . . .	
Edwin Vickers, . . .	Milham, . . .	Marlborough, . . .	
H. C. Hudson, . . .	Milham, . . .	Marlborough, . . .	
Homer King, . . .	Tatnue, . . .	Worcester, . . .	400
C. L. Allen, . . .	Weasel, . . .	Worcester, . . .	400
J. A. Holden, . . .	Ball, . . .	Holden, . . .	400
W. H. Haynes, . . .	Hop, . . .	Shrewsbury, . . .	400
Dwight F. Lane, . . .	Cranes, . . .	Berkley, . . .	400
James F. Paul, . . .	Pine Swamp, . . .	Dighton, . . .	400
William H. Leonard, . . .	Rumford, . . .	East Foxborough, . . .	400
W. W. Ottendorff, . . .	Chicken, . . .	Medway, . . .	400

Fingerling Brook Trout Plants—Concluded.

APPLICANTS.	Name of Brook.	Town..	Number.
Albert W. Lewis, . . .	Nonquochoke,	Dartmouth, . . .	400
L. C. Humphrey, . . .	Doggetts,	Rochester, . . .	1,000
William A. Andrews, .	Millers,	Middleborough, .	2,000
George A. Philbrook, .	Pratts and Fords, . . .	Middleborough, .	
Samuel Shaw,	Clarks Spring,	Middleborough, .	
A. V. Smith,	Bennetts,	Middleborough, .	
George W. Alcott, . . .	Woods,	Billerica,	400
Edward B. Haskell, . .	Webb,	Billerica,	400
Frank A. Griffin, . . .	Vim,	Westford,	400
William A. Lang, . . .	Ambrose Hale,	Westford,	400
Caleb L. Smith,	Blind,	Chelmsford, . . .	400
George Drinan,	Richardson,	Dracut,	400
T. L. Paige,	East Street,	Amherst,	750
J. F. Page,	Dickinsons,	Amherst,	
George Cutler,	Russell,	Amherst,	
T. R. Hill,	Hop,	Amherst,	
E. B. Dickinson, . . .	Taylor,	Amherst,	600
R. W. Aldrich,	Buffum,	Pelham,	
J. P. Anderson,	Wedge,	Pelham,	
H. R. Davidson,	Cook,	Pelham,	
E. P. Bartlett,	Amethyst,	Pelham,	1,050
S. E. Bliss,	Leaping Well,	South Hadley, . .	
George Hoffman, . . .	Leaping Well,	South Hadley, . .	
B. C. Brainard,	Leaping Well,	South Hadley, . .	
T. F. Buckley,	Buttery,	South Hadley, . .	150
F. E. White,	Buttery,	South Hadley, . .	
F. M. Smith,	Buttery,	South Hadley, . .	
William Chase,	Willimansett,	Chicopee,	
L. W. Taylor,	Muddy,	Granby,	450
H. S. Taylor,	Creamery,	Granby,	
Charles Spooner, . . .	Stoney,	Granby,	
Edward Miller,	Parsons,	Northampton, . .	
L. H. Porter,	Loudville,	Northampton, . .	250
W. G. Rotherham, . . .	Sluice,	Shelburne Falls, .	250
J. S. Outhouse,	Drakes,	Ashland,	250
J. M. Haigis,	Wilders,	Charlemont, . . .	250
James W. Wild,	Overy,	Charlemont, . . .	250
L. P. Woodward, . . .	Clarks,	Buckland,	250
E. C. Frost,	Apple Valley,	Buckland,	250
W. H. Walker,	Muddy,	Ware,	400
W. H. Thayer,	Mill,	Williamsburg, . .	200
W. G. Bisbee,	Blake,	Williamsburg, . .	200
W. G. Rice,	Stevens,	Worthington, . .	200
H. C. Puffer,	Higher,	Ludlow,	300
Charles C. Russell, . .	Pole Swamp,	Greenfield,	1,500
Charles C. Russell, . .	Fisk,	Greenfield,	
Charles C. Russell, . .	Osgood,	Greenfield,	
Charles C. Russell, . .	Fuller,	Greenfield,	
Charles C. Russell, . .	Punch,	Greenfield,	300
J. F. Bartlett,	Fall,	Montague,	
F. D. Belden,	Swamp,	Whately,	
Henry Bassett,	Hartley,	Charlemont, . . .	
L. H. Sears,	Chickley,	Hawley,	300
A. A. Shippee,	Shippee,	Rowe,	300
George H. Pomeroy, . .	Broad,	Easthampton, . .	300
F. P. Newkirk,	Broad,	Easthampton, . .	300
Thomas F. Ahearn, . .	Ahearn,	Sunderland, . . .	500
P. M. Carthy,	Hawks,	Methuen,	300
John F. Golden,	Dows,	Methuen,	300
C. P. Abbott,	Mill,	Groveland,	400
Moody Kimball,	Batchelder and Tanhouse, .	Rowley,	600
Moody Kimball,	Wheeler,	Newbury,	300
Moody Kimball,	Smallpox,	Salisbury,	300
George S. Fuller, . . .	Mosquito,	North Andover, .	300
A. W. Flye,	Alewive,	Gloucester, . . .	400
L. J. Knowlton,	Stoney,	Rockport,	400
B. Frank Smith,	Bakers,	Andover,	500
			59,600

Ponds stocked and closed in Accordance with Section 19, Chapter 91 of the Revised Laws.

NAME OF POND.	Town.	Salmon Fingerlings.	Rainbow Trout Fingerlings.	Brown Trout Fingerlings.	Pike Perch Fry.
Nuttings, . . .	Billerica, . . .	-	-	500	100,000
Flax, . . .	Lynn, . . .	-	1,000	-	200,000
Greenwater, . .	Becket, . . .	2,000	-	-	100,000
Shaw, . . .	Becket, . . .	-	-	500	-
Benton, . . .	Otis, . . .	-	-	500	-
Laurel Lake, . .	Lee, . . .	2,000	-	-	-
Long, . . .	Royalston, . .	-	-	500	200,000
White, . . .	Concord, . . .	-	-	500	200,000
Haggets, . . .	Andover, . . .	-	-	500	-
Spectacle, . . .	Littleton, . . .	2,000	-	-	-
Forge, . . .	Littleton, . . .	-	-	500	-
Hampton, . . .	Westfield, . . .	-	-	500	-
Lake Pearl, . .	Wrentham, . .	-	-	500	-
Bolton, . . .	Princeton, . . .	-	-	500	-
Massapoag, . .	Groton, . . .	2,000	-	-	-
Neck, . . .	West Barnstable,	2,000	-	-	-
Harris, . . .	Methuen, . . .	-	-	500	-
Pottapaug, . .	Dana, . . .	-	-	500	-
Winthrop, . . .	Holliston, . . .	-	-	-	200,000
Quabbin Lake, .	Greenwich, . .	2,000	-	-	-
		12,000	1,000	6,000	1,000,000

Ponds stocked but not closed.

NAME OF POND.	Town.	Brook Trout Yearlings.	Pike Perch Fry.	Pike Perch Eggs.
South West, . . .	Athol, . . .	-	200,000	-
Forge, . . .	Granby, . . .	-	200,000	-
Fort Meadow, . .	Marlborough, .	-	200,000	-
Lake Quinsigamond,	Worcester, . .	1,500	-	500,000
Dorothea, . . .	Millbury, . . .	-	-	600,000
Singletary, . . .	Sutton, . . .	-	-	900,000
		1,500	600,000	2,000,000

Ponds restocked.

NAME OF POND.	Town.	Brown Trout Fingerlings.	Pike Perch Fry.	Pike Perch Eggs.	Landlocked Smelt Eggs.
Middle, . . .	North Dana,	—	200,000	—	—
Hardwick, . . .	Ware, . . .	—	200,000	—	—
Round, . . .	Palmer,	—	200,000	—	—
Bridgman, . . .	Belchertown,	—	—	2,500,000	—
Onota Lake, . . .	Pittsfield, .	—	—	—	2,000,000
Snows, . . .	Ware, . . .	—	—	—	2,000,000
Watuppa Lake, .	Fall River, .	—	—	—	2,000,000
Winnecunnet Lake,	Norton, .	500	—	—	—
		500	600,000	2,500,000	6,000,000

*Brooks stocked with Brown Trout Fingerlings, and closed in Accordance with
Section 5, Chapter 91 of the Revised Laws.*

NAME OF BROOK.	Town.	Brown Trout.
Shawsheen River, . . .	Andover, . . .	650
Heath, . . .	Tewksbury, . . .	1,300
Content, . . .	Billerica, . . .	550
		2,500

[C.]

DISTRIBUTION OF PHEASANTS.

Pheasants were liberated in the covers in various sections of the State, as indicated in the following list, which also embraces the names of applicants for birds:—

Chester B. Williams,	.	.	.	.	.	Wayland.
Moody Kimball,	.	.	.	.	.	Rowley.
C. P. Abbott,	.	.	.	.	.	Groveland.
William H. Leonard,	.	.	.	.	.	East Foxborough.
Rupert S. Morrill,	.	.	.	.	.	Georgetown.
Harry D. Hunt,	.	.	.	.	.	North Attleborough.
Charles C. Russell,	.	.	.	.	.	Greenfield.
Shepard R. Dyer,	.	.	.	.	.	Plainfield.
Charles M. Kimball,	.	.	.	.	.	South Acton.
J. Myron Moore,	.	.	.	.	.	Gardner.
Charles E. Bass,	.	.	.	.	.	Warwick.
G. F. Geffkin,	.	.	.	.	.	Brimfield.
F. M. Draper,	.	.	.	.	.	East Norton.
Thomas B. Rounds,	.	.	.	.	.	Somerset.
Sanborn G. Tenney,	.	.	.	.	.	Williamstown.
Arthur V. Stevens,	.	.	.	.	.	Cummington.
C. H. Greene,	.	.	.	.	.	Northfield.
G. H. Perkins,	.	.	.	.	.	Westfield.
Edward Miller,	.	.	.	.	.	Northampton.
Henry P. Andrews,	.	.	.	.	.	Hudson.
M. A. Morse,	.	.	.	.	.	Belchertown.
John E. McClellan,	.	.	.	.	.	Grafton.
F. M. Smith,	.	.	.	.	.	South Hadley.
H. C. Fay,	.	.	.	.	.	Athol.
C. V. Dudley,	.	.	.	.	.	Whitinsville.
Dana Malone,	.	.	.	.	.	Greenfield.
Howard Marston,	.	.	.	.	.	Centreville.
John Kenrick,	.	.	.	.	.	Orleans.
Frank M. Chace,	.	.	.	.	.	Fall River.
John L. Rankin,	.	.	.	.	.	Taunton.
Henry O. Whiting,	.	.	.	.	.	Plymouth.
C. W. Bradford,	.	.	.	.	.	Sturbridge.
G. S. Alcott,	.	.	.	.	.	Tyngsborough.

Alexander Pope,	.	.	.	.	.	Hingham.
Clifford E. Robinson,	.	.	.	.	.	Hinsdale.
Moody Kimball,	.	.	.	.	.	Newburyport.
F. I. Shaw,	.	.	.	.	.	Lakeville.
Charles S. Cook,	.	.	.	.	.	Halifax.
Cyrus A. Taft,	.	.	.	.	.	Whitinsville.
George L. Brown,	.	.	.	.	.	Littleton.
E. P. Bartlett,	.	.	.	.	.	Pelham.
George Clark,	.	.	.	.	.	Millville.
A. M. Lyman,	.	.	.	.	.	Montague.
Henry Boynton,	.	.	.	.	.	Lowell.
Lyman P. Hapgood,	.	.	.	.	.	Athol.
Edward L. McMahon,	.	.	.	.	.	Billerica.
John N. Cole,	.	.	.	.	.	Andover.
David E. Barnum,	.	.	.	.	.	Burlington.
W. H. Walker,	.	.	.	.	.	Greenwich.
J. Franklin Wight,	.	.	.	.	.	Wellesley Farms.
H. E. Reynolds,	.	.	.	.	.	Braintree.
John W. Duncan,	.	.	.	.	.	Boston.
G. H. Doty,	.	.	.	.	.	Waltham.

[D.]

DISTRIBUTION OF BELGIAN HARES.

Belgian hares have been liberated in the covers, as indicated in the following list, in compliance with applications received from the persons whose names appear : —

Sanborn G. Tenney,	. . . . .	Williamstown.
G. H. Perkins,	. . . . .	Westfield.
Charles Russell,	. . . . .	Greenfield.
Charles M. Kimball,	. . . . .	South Acton.
James H. Krum, Jr.,	. . . . .	North Adams.
Edward Miller,	. . . . .	Northampton.
Louis H. Warner,	. . . . .	Northampton.
P. H. Clarisey,	. . . . .	Dalton.
Edward Brooks,	. . . . .	Methuen.
Thomas Stackhouse,	. . . . .	Marshfield Hills.
C. H. Morse,	. . . . .	Petersham.
F. M. Haskins,	. . . . .	Savoy.
C. W. Hammond,	. . . . .	Fairhaven.
W. E. Brown,	. . . . .	Cheshire.
O. F. Fuller,	. . . . .	Blackstone.
L. D. Baker,	. . . . .	Wellfleet.
C. V. Dudley,	. . . . .	Northbridge.
Arthur W. Beckford,	. . . . .	Danvers.
Thomas B. Rounds,	. . . . .	Somerset.
John L. Rankin,	. . . . .	Taunton.
C. H. Babcock,	. . . . .	Palmer.
Selectmen,	. . . . .	Truro.
C. E. Bass,	. . . . .	Warwick.
C. H. Greene,	. . . . .	Northfield.
W. D. Lepper,	. . . . .	Marlborough.
B. W. Williams,	. . . . .	Attleborough.
Michael Shea,	. . . . .	New Bedford.
George Pogue,	. . . . .	Grafton.
F. M. Smith,	. . . . .	South Hadley.
E. P. Bartlett,	. . . . .	Amherst.
Sutton Hatchery,	. . . . .	Sutton.
J. W. Delano,	. . . . .	Marion.

[E.]

ARRESTS AND CONVICTIONS.

The following tabulated statement gives in detail the result of the enforcement of the fish and game laws, so far as arrests and convictions are concerned.

The total number of arrests was 169, and the aggregate of convictions was 139. Among those convicted, 4 appealed, 26 cases were filed in addition to those cases where there was more than one charge and one complaint was filed while a fine was imposed for the other, and 2 were continued for sentence or the action of the court was unreported; 24 of the persons arrested were discharged, 1 was placed on probation; in 3 cases where the parties arrested were charged with more than one violation of law they were discharged on one and convicted on the other; and in 3 similar cases one of the charges was filed after conviction and they were fined on the other. In 2 cases it was reported that prisoners were discharged after pleading guilty; and the case of 1 was *nol prossed*.

For further detail, see chapter on the enforcement of law.

Report upon Convictions, Fines, etc., for Violations of Fish and Game Laws.

STATE v. —	TOWN OR CITY.	Offence.	Court Decision.	Fine.
William Seace,*	Pittsfield,	Hunting with ferret,	Convicted,	On file.
George G. England,	Holyoke,	Shooting game out of season,	Convicted,	\$20 00
George L. Stone,	Pittsfield,	Illegal fishing,	Convicted,	2 00
W. H. Tolherst,	Pittsfield,	Illegal fishing,	Convicted,	10 00
Ralph Volin,	Pittsfield,	Illegal fishing,	Discharged,	—
Dalico Salvatory,	North Adams,	Shooting song birds,	Convicted,	10 00
Domino Roberts,	Williamstown,	Illegal possession of a heron,	Convicted,	On file.
Frank Blake,	Williamstown,	Illegal possession of a heron,	Convicted,	On file.
Robert S. Rhodes,	Williamstown,	Illegal hunting,	Discharged,	—
Louis R. Anson,	Alford,	Illegal hunting,	Convicted,	5 00
Joseph Della,	Alford,	Sunday hunting,	Convicted,	5 00
Sumner Burrage,	Hardwick,	Fishing on closed brook,	Convicted,	20 00
Xavier Bouvier,†	Ware,	Shooting song birds,	Convicted,	On file.
Xavier Bouvier,†	Ware,	Hunting with ferret,	Convicted,	20 00
Eli Cross,	Ware,	Hunting with ferret,	Convicted,	20 00
Noe Cross,	Ware,	Hunting with ferret,	Convicted,	20 00
Louis Giard,	Ware,	Hunting with ferret,	Convicted,	20 00
Bert Roberts,	Westfield,	Illegal fishing,	Convicted,	5 00
James Rowley,	Westfield,	Illegal fishing,	Convicted,	5 00
Martin Petonyak,	Westfield,	Chasing deer,	Discharged,	—
Michael Petonyak,	Westfield,	Chasing deer,	Discharged,	—
Adam Petonyak,	Westfield,	Chasing deer,	Discharged,	—
James Barber,	Springfield,	Sunday hunting,	Convicted,	5 00
		Exposing, offering for sale and having in possession trout out of season,	Convicted,	—
F. E. Thayer,	Springfield,	Shooting game out of season,	Convicted,	On file.
Arthur Germaine,	Hardwick,	Shooting game out of season,	Convicted,	10 00
Frank Laschappelle,‡	Hardwick,	Sunday hunting, and hunting with ferret,	Convicted,	5 00

Alvin Barrett,§	Gardner, .	Chasing deer, .	Convicted, .	On file.
Arthur Barrett,§	Gardner, .	Chasing deer, .	Convicted, .	On file.
Henry A. Mower, .	Worcester, .	Fishing on closed brook, .	Convicted, .	10 00
C. F. Smith, .	Worcester, .	Short trout, .	Convicted, .	10 00
Edison Newell, .	Groenwich, .	Fishing on closed brook, .	Convicted, .	On file.
Frank Foley, .	Monson, .	Short trout, .	Convicted, .	10 00
Isaac Virosky, .	Monson, .	Sunday hunting, .	Convicted, .	5 00
Samuel Herendeen, .	Monson, .	Allowing dogs to chase deer, .	Convicted, .	On file.
Albert Hapgood, .	Oakham, .	Illegal fishing, .	Convicted, .	5 00
Dennis Leyden, .	Oakham, .	Illegal fishing, .	Discharged, .	-
Walter Dean,||	Oakham, .	Illegal fishing, and obstructing stream with net, .	Convicted, .	25 00
Mason Dean,||	Oakham, .	Illegal fishing, and obstructing stream with net, .	Convicted, .	25 00
James W. Needham,¶	Oakham, .	Illegal possession of game, .	Convicted, .	20 00
Joseph Brothers, .	Palmer, .	Fishing on closed pond, .	Convicted, .	On file.
Lawrence Brothers, .	Palmer, .	Fishing on closed pond, .	Convicted, .	On file.
Frank Kane, .	Palmer, .	Fishing on closed pond, .	Convicted, .	On file.
George M. Fisher, .	Belchertown, .	Selling wild trout, .	Convicted, .	19 00
Thomas O'Keefe, .	Montague, .	Short trout, .	Convicted, .	70 00
Charles J. Andrews, .	Montague, .	Short trout, .	Convicted, .	100 00
Jacob J. Meyle,**	New Salem, .	Assault on officer, .	Convicted, .	On file.
F. M. Jenounson, .	Orange, .	Fishing on closed pond, .	Convicted, .	20 00
E. Putnam, .	Orange, .	Fishing on closed pond, .	Convicted, .	20 00
A. P. Putnam, .	Orange, .	Fishing on closed pond, .	Convicted, .	20 00
William Ingoldsby, .	Orange, .	Fishing on closed pond, .	Convicted, .	20 00
John Ricuisi, .	Northampton, .	Fishing on closed pond, .	Convicted, .	20 00
Jacob Suiontek, .	Northampton, .	Illegal fishing, .	Discharged, .	-
Thomas Grochowski, .	Northampton, .	Illegal fishing, .	Discharged, .	-
	Northampton, .	Illegal fishing, .	Convicted, .	25 00

* Filed on payment of costs.

† Charge of hunting with ferret, was put on file.

‡ Charge of obstructing stream with net; put on file.

** In this case the assault was made in consequence of an attempt to arrest other parties.

† This person was arrested and convicted twice, as shown.

§ Filed on payment of costs.

¶ Appealed.

Report upon Convictions, Fines, etc., for Violations of Fish and Game Laws — Continued.

STATE v. —	TOWN OR CITY.	Offence.	Court Decision.	Fine.
Anthony Kanninski,	Northampton,	Illegal fishing,	Convicted,	\$25 00
Theodore Gedroe,	Northampton,	Illegal fishing,	Convicted,	25 00
George J. Mason,	Holyoke,	Illegal fishing,	Convicted,	8 00
Napoleon Newton,	Holyoke,	Illegal fishing,	Convicted,	8 00
Henry P. Gadreault,	Holyoke,	Illegal fishing,	Convicted,	8 00
William Henry,*	Worcester,	Illegal fishing,	Convicted,	40 00
Claus Hendrickson,*	Worcester,	Illegal fishing,	Convicted,	40 00
Benjamin F. Babb,	Southwick,	Shooting black bass,	Convicted,	20 00
William S. Saunders,	Southwick,	Illegal fishing,	Discharged,	—
John Saunders,	Southwick,	Illegal fishing,	Discharged,	—
William O'Neil,	Southwick,	Illegal fishing,	Convicted,	3 00
George Nelson,	Danvers,	Illegal fishing,	Discharged,	—
George W. Peterson,	Revere,	Sunday hunting,	Discharged,	—
George N. Bliss,†	Revere,	Sunday hunting,	Discharged,	—
John C. Phillips,	Falmouth,	Hunting deer,	Convicted,	100 00
Carmano Gionio,	Beverly,	Shooting pheasant,	Convicted,	20 00
M. Dominico,	Boston,	Shooting song birds,	Convicted,	50 00
Edward Smith,	Boston,	Shooting song birds,	Convicted,	50 00
Eben Whittier,‡	Illegal possession of song birds,	Illegal possession of song birds,	Nol prossed,	—
Antonio Brown,§	'Taking birds' eggs,	'Taking birds' eggs,	Convicted,	On file.
Daniel E. Hallett,	Illegal possession of song and insectivorous birds,	Illegal possession of song and insectivorous birds,	Convicted,	50 00
Gustave Holburg,	Sunday hunting,	Sunday hunting,	Convicted,	10 00
Frank Black,	Sunday hunting,	Sunday hunting,	Convicted,	5 00
Eric Svenson,	Pursuing wild fowl with naphtha launch,	Pursuing wild fowl with naphtha launch,	Convicted,	20 00
James Magee,	Short lobsters,	Short lobsters,	Convicted,	20 00
Horace Snow,	Short lobsters,	Short lobsters,	Convicted,	3 00
C. D. Lemay,	Sunday fishing,	Sunday fishing,	Convicted,	3 00
			Convicted,	5 00

John O'Donnell,	Shirley, .	Sunday hunting,	Convicted,	5 00
Thomas Taylor,	Fall River, .	Fishing on closed pond,	Convicted,	On file.
James Chatman,	Fall River,	Fishing on closed pond,	Convicted,	On file.
John Slater,	Fall River,	Fishing on closed pond,	Convicted,	On file.
Rasa Gurnett,	Fall River,	Fishing on closed pond,	Convicted,	On file.
Joseph Kelley,	Fall River,	Fishing on closed pond,	Convicted,	On file.
Joseph Chabot,	Fall River,	Fishing on closed pond,	Convicted,	20 00
Fred Bignault,	Fall River,	Fishing on closed pond,	Convicted,	20 00
Foster G. Sherman,	Fall River,	Short lobsters,	Convicted,	15 00
Hector Basnet,	Fall River,	Fishing on closed pond,	Convicted,	20 00
Napoleon Basnet,	Fall River,	Fishing on closed pond,	Convicted,	20 00
Louis Paquet,	Fall River,	Fishing on closed pond,	Convicted,	20 00
John McDonald,	Fall River,	Fishing on closed pond,	Convicted,	20 00
Joseph Geron,	Fall River,	Fishing on closed pond,	Convicted,	20 00
Malcolm McDonald,	Fall River,	Fishing on closed pond,	Convicted,	20 00
Eli Maynard,	Fall River,	Short lobsters,	Convicted,	On file.
Charles A. Sanford,	Fall River,	Short lobsters,	Convicted,	15 00
Derwin T. Johnson,	Fall River,	Sunday hunting,	Convicted,	15 00
John T. Sullivan,	Fall River,	Sunday hunting,	Convicted,	5 00
James S. Reed,	Fall River,	Sunday hunting,	Convicted,	5 00
Sposim Mazzareno,	Fall River,	Shooting song birds,	Convicted,	20 00
Austin A. McAuliff,	Fall River,	Sunday hunting,	Convicted,	5 00
George M. Wilkinson,||	Gloucester,	Short lobsters,	Convicted,	250 00
John M. Dennison,¶	Gloucester,	Short lobsters,	Convicted,	30 00
William Morrison,	Gloucester,	Sunday hunting,	Convicted,	10 00
Fred B. Wait,**	Gloucester,	Short and mutilated lobsters,	Convicted,	75 00

* These parties were arrested by Southbridge constables.

† Placed on probation, and paid costs of court.

|| Appealed, and fined in superior court \$70.

** Discharged on charge of short lobsters. The total fine in this case it was alleged might have been more than \$2,200.

† Appealed. In superior court at Barnstable he was discharged.

§ In default of payment, he was committed to jail for three months.

¶ Appealed, and fined in superior court \$30.

Report upon Convictions, Fines, etc., for Violations of Fish and Game Laws — Continued.

STATE v. —	TOWN OR CITY.	Offence.	Court Decision.	Fine.
Thomas Moses,*	Gloucester,	Sunday hunting, and illegal possession of feathers of song birds,	Convicted,	\$10 00
Randolph Taylor,	Manchester,	Short lobsters,	Convicted,	15 00
William Haskell,	Rockport,	Short and egg-bearing lobsters,	Discharged,	-
A. Kalim,	Ayer,	Sunday hunting,	Convicted,	2 00
John T. Sherman,	Ayer,	Sunday hunting,	Convicted,	3 00
Benjamin Pond,	Ayer,	Illegal hunting,	Discharged,	-
Henry B. Johnson,	Ayer,	Sunday hunting, and trapping partridge,	Discharged,	-
William S. Dudley,	Harvard,	Sunday hunting,	Convicted,	5 00
Ralph L. Murray,	Harvard,	Sunday hunting,	Convicted,	5 00
M. J. Luchia,	Lynn,	Illegal fishing,	Convicted,	On file.
Gustave T. B. Bagley,	Peabody,	Fishing on closed pond,	Discharged,	-
Daniel Buxton, 2d,	Peabody,	Fishing on closed pond,	Discharged,	-
Henry R. Osborne,	Peabody,	Fishing on closed brook,	Discharged,	-
Walter H. Burnham,	Wenham,	Fishing on closed pond,	Convicted,	On file.
Charles Millo,†	Newburyport,	Illegal fishing,	Convicted,	On file.
David Scipe,†	Lawrence,	Illegal possession of game,	Convicted,	On file.
Frank Geralit,	Lawrence,	Illegal hunting,	Convicted,	On file.
Assil Misduck,	Lawrence,	Illegal hunting,	Convicted,	20 00
Jules Cotton,	Lawrence,	Illegal hunting,	Convicted,	20 00
William Butler,	Lawrence,	Sunday hunting, and hunting with ferret,	Convicted,	10 00
Henry Young,	Lawrence,	Sunday hunting, and hunting with ferret,	Convicted,	20 00
William Jaques,	Newburyport,	Sunday hunting,	Convicted,	40 00
Lawrence Tilton,	Newburyport,	Sunday hunting,	Discharged,	-
Patrick Kegan,	Lowell,	Sunday hunting,	Convicted,	15 00
George M. Farwell,	New Hampshire,	Short trout,	Discharged,	-
Ernest O. Pope,§	Hull,	Short lobsters,	Convicted,	10 00
			Convicted,	35 00

James H. Jones, . . .	Dover, . . .	Sunday hunting, . . .	Convicted, . . .	25 00
E. J. Burgess, . . .	Dover, . . .	Sunday hunting, . . .	Convicted, . . .	25 00
Marcus W. Dunham, . . .	Nantucket, . . .	Sunday hunting, . . .	Discharged, . . .	-
Biagti Nicola, . . .	Clinton, . . .	Shooting song birds, . . .	Convicted, . . .	10 00
Eben L. Whittier, || . . .	Malden, . . .	Illegal hunting, . . .	Convicted, . . .	On file.
John Sasso, ¶ . . .	Boston, . . .	Illegal hunting, . . .	Convicted, . . .	10 00
George Latoff,** . . .	Boston, . . .	Shooting song birds, . . .	Convicted, . . .	10 00
Frank Negro,** . . .	East Boston, . . .	Shooting song birds, . . .	Convicted, . . .	5 00
Frank Racco, †† . . .	Boston, . . .	Sunday hunting, . . .	Discharged, . . .	-
L. C. Creamer, . . .	Boston, . . .	Short lobsters, . . .	Discharged, . . .	-
Michael Nazzaro, . . .	East Boston, . . .	Shooting song birds, . . .	Convicted, . . .	30 00
Frank S. Chapman, . . .	Mansfield, . . .	Sunday hunting, and shooting game out of season, . . .	Convicted, . . .	15 00
George Farranton, †† . . .	Haverhill, . . .	Illegal fishing, . . .	Convicted, . . .	On file.
Henry Hayden, . . .	Braintree, . . .	Sunday hunting, . . .	Convicted, . . .	3 00
Michael Patral, . . .	Braintree, . . .	Sunday hunting, . . .	Convicted, . . .	3 00
Joseph Caporanno, . . .	Foxborough, . . .	Sunday hunting, . . .	Convicted, . . .	10 00
Nicholas Thomas, §§ . . .	Sharon, . . .	Killing deer, . . .	Convicted, . . .	100 00
Emmel Jophson, . . .	Worcester, . . .	Sunday hunting, . . .	Convicted, . . .	10 00
William S. Anderson, |||| . . .	Middleborough, . . .	Sunday hunting, and illegal possession of game, . . .	Convicted, . . .	20 00

* Discharged for illegal possession of song bird feathers.

† Deputy Mailloux writes that Millo admitted his guilt, but the case was placed on file.

‡ Case was filed upon payment of \$5 for expenses.

§ Appealed.

|| Placed on probation for three months, paying only costs of court.

¶ Had caught two small birds with bird lime. Another man was with him, but escaped.

** Each of these persons had three insectivorous birds, for the killing of which the legal penalty is \$10 each.

†† Pledged guilty to the offence, but was discharged.

‡‡ It was reported that the reason assigned by the court for putting this case on file was because the judge considered \$20 too large a fine for the first offence.

§§ Appealed. Arrest made by local officer.

|||| Charge of illegal possession of game put on file.

Report upon Convictions, Fines, etc., for Violations of Fish and Game Laws — Concluded.

STATE v. —	TOWN OR CITY.	Offence.	Court Decision.	Fine.
Elsworth L. Luce,*	New Bedford,	Sunday hunting, and shooting game out of season,	Convicted, .	\$5 00
Thomas B. Hines,	Rhode Island,	Sunday hunting, .	Discharged, .	—
George F. Potter,	Westport,	Sunday hunting, .	Convicted, .	5 00
Reynold Weiker,	Medfield,	Sunday hunting, .	Convicted, .	10 00
Lawrence Mahoney,	Norwood,	Sunday hunting, .	Convicted, .	10 00
Arthur L. Boyden,	Norwood,	Sunday hunting, .	Convicted, .	10 00
Antone Veador,	Weymouth,	Short lobsters, .	Convicted, .	50 00
Almorest Forgette,	Springfield,	Illegal fishing, .	Convicted, .	25 00
Leonard Johnson,	Springfield,	Illegal fishing, .	Convicted, .	25 00
Peter Nelson,	New Bedford,	Having tern's eggs in possession, .	Convicted, .	20 00
Thomas Mayo,	Lynn,	Illegal hunting, .	Convicted, .	10 00
William Green,	Ware,	Ferretting, .	Convicted, .	20 00
George H. England,	Holyoke,	Shooting partridge out of season, .	Convicted, .	20 00
D. H. Marlow,	Southbridge,	Ferretting, .	Convicted, .	20 00
Harvey Foote,†	Charlton,	Ferretting, .	Convicted, .	20 00
Fred W. Odgen,‡	Providence, R. I.,	Sunday hunting, .	—	—
James Wiley,‡	Norfolk,	Sunday hunting, .	—	—

* Charge of shooting game out of season discharged.

† This person was a recently appointed deputy of the commission. As soon as there was doubt of his disposition to protect game, he was carefully watched. The case was continued until Jan. 4, 1904.

‡ Cases not settled at end of the year.

[F.]

LEGISLATION.

Acts of 1903.

[CHAPTER 155.]

AN ACT TO REMOVE THE CONDITIONS ON WHICH A CERTAIN FUND ACQUIRED BY THE SALE OF FISHERY RIGHTS IS HELD BY THE TOWN OF WEYMOUTH.

Be it enacted, etc., as follows:

SECTION 1. Section five of chapter ninety-two of the acts of the year eighteen hundred and forty-six is hereby repealed.

SECTION 2. This act shall take effect upon its passage. [*Approved March 16, 1903.*]

[CHAPTER 162.]

AN ACT TO PROVIDE FOR THE BETTER PROTECTION OF MARSH AND BEACH BIRDS.

Be it enacted, etc., as follows:

Section five of chapter ninety-two of the Revised Laws is hereby amended by striking out the word “May”, in the third line, and inserting in place thereof the word:—March,—so as to read as follows:—*Section 5.* Whoever takes or kills a plover, snipe, sandpiper, rail or any of the so-called shore, marsh or beach birds between the first day of March and the fifteenth day of July, or a wild or passenger pigeon, gull or tern at any time, shall be punished by a fine of ten dollars for every bird so taken or killed; but the provisions of this section shall not apply to the great American herring gull nor to the great black-backed gull between the first day of November and the first day of May following. [*Approved March 18, 1903.*]

[CHAPTER 196.]

AN ACT RELATIVE TO THE MAKING AND PUBLICATION OF RETURNS OF
INSPECTION OF FISH.

Be it enacted, etc., as follows :

SECTION 1. Section five of chapter fifty-six of the Revised Laws, which provides for an annual return and publication relative to the inspection of fish, is hereby repealed.

SECTION 2. This act shall take effect upon its passage. [*Approved April 6, 1903.*]

[CHAPTER 205.]

AN ACT TO PROHIBIT THE SALE OF ALL TROUT EXCEPT THOSE ARTI-
FICIALLY REARED.

Be it enacted, etc., as follows :

SECTION 1. It shall be unlawful at any time within three years after the passage of this act to buy or sell trout, or to offer trout for sale, within the Commonwealth: *provided, however*, that nothing in this act shall prevent the sale of trout artificially propagated or maintained or hatched from the egg in the house of the owner and grown in pools of said owner, in so far as the sale thereof is permitted by the laws of this Commonwealth now in force.

SECTION 2. Whoever violates any provision of this act shall be punished by a fine of one dollar for each trout so bought, sold or offered for sale. [*Approved April 8, 1903.*]

[CHAPTER 206.]

AN ACT TO PROVIDE FOR THE BETTER PROTECTION OF WOODCOCK AND
RUFFED GROUSE.

Be it enacted, etc., as follows :

Section two of chapter ninety-two of the Revised Laws is hereby amended by striking out the words "prior to the thirteenth day of July in the year nineteen hundred and three", in the fifth and sixth lines, so as to read as follows: — *Section 2.* Whoever takes, kills or has in possession, or buys, sells or offers for sale, a woodcock or a ruffed grouse, commonly called partridge, between the first day of December and the first day of October following, whenever or wherever such bird may have been taken or killed, or whoever at any time buys, sells, offers for sale or has in possession for sale a woodcock or ruffed grouse, commonly called partridge, whenever or wherever such bird may have been taken or killed, shall be punished by a fine of twenty dollars for each bird. [*Approved April 9, 1903.*]

[CHAPTER 216.]

AN ACT TO PROVIDE FOR THE PROTECTION OF SHELLFISH IN THE TOWN OF
EDGARTOWN.

Be it enacted, etc., as follows :

SECTION 1. No person shall take any shellfish from their beds or wilfully obstruct the growth of any shellfish within the town of Edgartown, except as is hereinafter provided.

SECTION 2. The selectmen of said town may give permits in writing to any person to take shellfish from their beds within said town, at such times, in such quantities, and for such uses, as they shall deem expedient. But any inhabitant of said town may without such permit take from the beds in said town shellfish for the use of his family, not exceeding in quantity one bushel, including shells, in any one day ; and any fisherman may without such permit take shellfish from the said beds for bait for his own use, not exceeding in quantity one bushel, including shells, in any one day.

SECTION 3. No person shall take from their beds in said town, or sell or offer for sale, or have in his possession, any little neck clams or quahaugs measuring less than one and one half inches across the widest part.

SECTION 4. Whoever violates any provision of this act shall be punished by a fine of not less than ten nor more than one hundred dollars.

SECTION 5. The district court of Dukes County shall have concurrent jurisdiction with the superior court of all offences under this act.

SECTION 6. So much of section eighty-five of chapter ninety-one of the Revised Laws as is inconsistent herewith shall not apply to the town of Edgartown. [*Approved April 9, 1903.*]

[CHAPTER 244.]AN ACT TO PROVIDE FURTHER FOR THE PROTECTION OF CERTAIN MARSH
BIRDS.

Be it enacted, etc., as follows :

SECTION 1. Whoever takes or kills any heron or bittern, or has in possession any such bird or part thereof, whenever or wherever taken, shall be punished by a fine not exceeding ten dollars for every bird so taken or killed, or bird or part of bird so had in possession.

SECTION 2. Nothing in this act shall prevent the owner or keeper of any trout pond or trout hatchery from killing any heron or bittern engaged in the act of destroying fish ; nor shall anything herein

contained prevent the taking or possession of said birds by natural history associations, museums, or holders of certificates authorizing the collection of specimens for scientific purposes. [Approved April 16, 1903.]

[CHAPTER 245.]

AN ACT TO PROVIDE FOR THE BETTER PROTECTION OF DEER.

Be it enacted, etc., as follows :

Section seventeen of chapter ninety-two of the Revised Laws is hereby amended by striking out the whole of said section and inserting in place thereof the following : — *Section 17.* Whoever, before the first day of November in the year nineteen hundred and eight, hunts, chases, wounds, injures or kills a deer, except his own tame deer kept on his own grounds, shall forfeit one hundred dollars for each offence : *provided, however,* that nothing contained herein shall prevent an owner or occupant of cultivated land from driving a deer therefrom, but dogs shall not be used for this purpose, nor shall the deer be wounded or injured. [Approved April 16, 1903.]

[CHAPTER 246.]

AN ACT TO PROVIDE FOR THE BETTER PROTECTION OF FISH.

Be it enacted, etc., as follows :

Section one hundred and thirty-three of chapter ninety-one of the Revised Laws is hereby amended by striking out the whole of said section and inserting in place thereof the following : — *Section 133.* Whoever puts or throws into any waters for the purpose of taking or destroying fish therein any poisonous substance, simple, mixed or compound, or whoever kills or destroys fish by the use of dynamite or other explosive, or explodes dynamite or powder in fishing waters, shall forfeit ten dollars for each offence : *provided, however,* that the provisions of this act shall not apply to operations of the federal government, of the state government, or of any municipal government in this Commonwealth, nor to the use of explosives for raising the body of a drowned person. [Approved April 16, 1903.]

[CHAPTER 274.]

AN ACT TO AUTHORIZE THE COMMISSIONERS ON FISHERIES AND GAME
TO RESTOCK CERTAIN GREAT PONDS WITH FOOD FISH.

Be it enacted, etc., as follows :

Section nineteen of chapter ninety-one of the Revised Laws is hereby amended by inserting after the word “ enforced ”, in the tenth

line, the words : — The commissioners may restock a pond with fish and extend the provisions of this section for an additional period of three years whenever they receive a petition therefor as herein provided, — so as to read as follows : — *Section 19.* The commissioners, upon the petition of the mayor and aldermen of a city or of the selectmen of a town within which a great pond or a portion thereof is situated, or of thirty or more inhabitants thereof, shall cause the waters of such pond to be stocked with such food fish as they judge to be best suited to such waters. They shall thereupon prescribe, for a period not exceeding three years, such reasonable regulations relative to the fishing in such ponds and their tributaries, with such penalties, not exceeding twenty dollars for one offence, as they deem to be for the public interest, and shall cause such regulations to be enforced. The commissioners may restock a pond with fish and extend the provisions of this section for an additional period of three years whenever they receive a petition therefor as herein provided. Five hundred dollars shall be annually appropriated by the Commonwealth to carry out the provisions of this section. [*Approved April 29, 1903.*]

[CHAPTER 287.]

AN ACT TO PROVIDE FOR THE BETTER PROTECTION OF SONG AND INSECTIVOROUS BIRDS.

Be it enacted, etc., as follows :

Section seven of chapter ninety-two of the Revised Laws is hereby amended by inserting after the word “dollars”, in the seventh line, the words : — for each bird taken or killed or each nest or egg destroyed, disturbed or taken contrary to the provisions of this section, — so as to read as follows : — *Section 7.* Whoever takes or kills a wild or undomesticated bird not named in sections two, three, four and five, except English sparrows, crow blackbirds, crows, jays, birds of prey, wild geese and fresh water and sea fowl not named in said sections, or wilfully destroys, disturbs or takes a nest or eggs of any wild or undomesticated birds, except such as are not protected by the provisions of this section, shall be punished by a fine of ten dollars for each bird taken or killed or each nest or egg destroyed, disturbed or taken contrary to the provisions of this section ; but a person over twenty-one years of age, who has a certificate from the commissioners on fisheries and game or from the president of the Boston Society of Natural History that he is engaged in the scientific study of ornithology or is collecting in the interest of a scientific institution, may at any season take or kill or take the nests and eggs of an undomesticated bird, except woodcock, ruffed grouse and quail ; but the provisions of this section shall not authorize a person to enter

upon private grounds without the consent of the owner thereof for the purpose of taking nests or eggs or killing birds. Said commissioners or the president of said society may at any time revoke such certificate. [*Approved April 30, 1903.*]

[CHAPTER 291.]

AN ACT RELATIVE TO THE ANNUAL REPORT OF THE BOARD OF COMMISSIONERS ON FISHERIES AND GAME.

Be it enacted, etc., as follows :

SECTION 1. The annual report of the board of commissioners on fisheries and game shall hereafter include the year ending on the thirty-first day of December, and shall be submitted on or before the fifteenth day of January next following.

SECTION 2. This act shall take effect upon its passage. [*Approved April 30, 1903.*]

[CHAPTER 294.]

AN ACT TO PROHIBIT THE USE OF TRAWLS IN CERTAIN PONDS.

Be it enacted, etc., as follows :

Section twenty-six of chapter ninety-one of the Revised Laws is hereby amended by striking out the whole of said section and inserting in place thereof the following :—*Section 26.* Whoever draws, sets, stretches or uses a drag net, set net, purse net, seine or trawl in any pond, or aids in so doing, shall be punished by a fine of not less than twenty nor more than fifty dollars ; and the use of more than ten hooks by one person shall be deemed a trawl within the meaning of this section. No floating devices shall be used in connection with such trawls. The provisions of this section shall not affect the rights of riparian proprietors of ponds mentioned in section twenty-three or the corporate rights of any fishing company. [*Approved April 30, 1903.*]

[CHAPTER 298.]

AN ACT TO PROHIBIT THE TAKING OF FISH BY NETS AND SEINES IN THE WATERS OF BARNSTABLE AND MASHPEE ON NANTUCKET SOUND.

Be it enacted, etc., as follows :

SECTION 1. For a period of three years after the passage of this act no person shall draw, set, stretch or use any drag net or set net, purse or sweep seine of any kind, except as is hereinafter provided, for taking fish anywhere in the waters of the towns of Barnstable and Mashpee on Nantucket Sound, so-called, northerly of or within a straight line extended from Point Gammon to Succonussett Point ; nor in any bay, harbor, cove or bight of said waters, nor in any inlet or stream flowing into the same : *provided, nevertheless,* that nothing

herein contained shall be so construed as to forbid or make unlawful the catching of menhaden or other small fish for bait purposes; nor the use of nets for the taking of herring; nor the use of dredges or drag nets for the taking of scallops.

SECTION 2. Whoever violates any provision of this act or aids or assists in so doing, shall be punished by a fine of not less than fifty dollars nor more than five hundred dollars for each offence, or by imprisonment for a term not exceeding six months.

SECTION 3. Any net, seine or movable device for catching fish used in violation of any provision of this act, together with any boat, craft, vessel, steamer or fishing apparatus employed in such illegal use, and any fish found therewith, are hereby declared to be public nuisances and forfeited; and it shall be lawful for any inhabitant of said Barnstable or Mashpee or any constable, police officer or deputy sheriff in the Commonwealth, to seize and detain, without warrant, for a period not exceeding forty-eight hours, any such net, seine or movable device, boat, craft, vessel, steamer or fishing apparatus found in use contrary to the provisions of this act, and any fish found therewith, to the end that the same may be libelled, if necessary, by due process of law. District courts and trial justices shall have concurrent jurisdiction with the superior court of all offences and proceedings under the provisions of this act, regardless of the value of the property libelled. [*Approved April 30, 1903.*]

[CHAPTER 329.]

AN ACT RELATIVE TO POSSESSION OF BODIES OR FEATHERS OF CERTAIN
BIRDS.

Be it enacted, etc., as follows:

SECTION 1. Section eight of chapter ninety-two of the Revised Laws is hereby amended by inserting after the word "section", in the third line, the words:—or of section five of this chapter,—so as to read as follows:—*Section 8.* Whoever has in possession the body or feathers of a bird, the taking or killing of which is prohibited by the provisions of the preceding section or of section five of this chapter, whether taken in this Commonwealth or elsewhere, or wears such feathers for the purpose of dress or ornament, shall be punished by a fine of ten dollars; but the provisions of this section shall not prohibit the taking or killing of such birds by the holders of certificates provided for in the preceding section, nor shall they apply to natural history associations or to the proprietors of museums, or other collections for scientific purposes, or to non-residents of the Commonwealth passing through it or temporarily dwelling therein.

SECTION 2. This act shall take effect on the first day of January in the year nineteen hundred and four. [*Approved May 7, 1903.*]

[CHAPTER 344.]

AN ACT TO PROVIDE FOR THE PAYMENT OF A BOUNTY FOR KILLING A
WILD CAT, CANADA LYNX OR LOUPCERVIER.

Be it enacted, etc., as follows :

SECTION 1. Whoever in any town kills a wild cat, Canada lynx or loup cervier not being in captivity shall, upon producing satisfactory evidence of such killing, be entitled to receive from the treasurer of the town the sum of five dollars ; and all sums so paid out shall be repaid to the town treasurer by the treasurer of the county in which the town is situated : *provided*, that a sworn statement thereof shall be transmitted by the town treasurer to the county treasurer.

SECTION 2. This act shall take effect upon its passage. [*Approved May 12, 1903.*]

[CHAPTER 348.]

AN ACT TO AUTHORIZE THE COMMISSIONERS ON FISHERIES AND GAME TO
CALL OR ATTEND A CONVENTION OF COMMISSIONERS OF LOBSTER-PRODUCING STATES AND OF THE BRITISH PROVINCES.

Be it enacted, etc., as follows :

SECTION 1. The commissioners on fisheries and game are hereby authorized to call a convention of the fish and game commissioners of the lobster-producing states and of the British provinces to meet at Boston during the year nineteen hundred and three, to determine on recommendations for uniform laws and regulations for the better preservation of the lobster, and for other like purposes. If such a convention is called elsewhere than at Boston the commissioners are authorized to attend the same, instead of calling a convention as provided in section one.

SECTION 2. The said commissioners may expend a sum not exceeding two hundred dollars in carrying out the purposes of this act.

SECTION 3. This act shall take effect upon its passage. [*Approved May 15, 1903.*]

[CHAPTER 407.]

AN ACT RELATIVE TO RECOVERY FOR DAMAGES CAUSED BY WILD DEER.

Be it enacted, etc., as follows :

Whoever suffers loss by the eating, browsing or trampling of his fruit or ornamental trees, vegetables, produce or crops by wild deer may, if the damage is done in a city, inform the officer of police of said city who shall be designated to receive such information by the mayor, and if the damage is done in a town, may inform the chair-

man of the selectmen of the town wherein the damage was done, who shall proceed to the premises where the damage was done and determine whether the same was inflicted by deer, and if so, appraise the amount thereof if it does not exceed twenty dollars. If, in the opinion of said officer of police or chairman, the amount of said damage exceeds twenty dollars, he shall appoint two disinterested persons, who, with himself, shall appraise under oath the amount thereof. The said officer of police or chairman shall return a certificate of the damages found, except in the county of Suffolk, to the treasurer of the county in which the damage is done, within ten days after such appraisal is made. The treasurer shall thereupon submit the same to the county commissioners, who, within thirty days, shall examine all such bills, and if any doubt exists, may summon the appraisers and all parties interested and may make such examination as they may think proper, and he shall transmit such bills, properly approved, to the auditor of accounts, and they shall be paid out of the treasury of the Commonwealth in the same manner as other claims against the Commonwealth. In the county of Suffolk the certificate of damages shall be returned to the treasurer of the city or town in which the damage is done, who shall exercise and perform the rights and duties hereby conferred and imposed upon the county commissioners in other counties. The appraisers shall receive from the county, — or in the county of Suffolk, from the city or town treasurer, — one dollar each for every such examination made by them, and the officer or the chairman of selectmen acting in the case shall receive twenty cents a mile, one way, for his necessary travel.

[Approved June 2, 1903.]

[G.]

STATISTICS.

The following tables show in detail, by counties, the statistics of the shore net and lobster fisheries of Massachusetts for the year ending Oct. 1, 1903, as reported to this commission. These tables embrace the fisheries with pound nets, weirs,* floating fish traps, fyke nets, seines, gill nets and pots, the latter being used for catching lobsters. They do not, however, include other branches of the shore fisheries, such as hand line or trawl line fishing, the oyster or clam fishing, etc.

Table No. 1 shows the number of fishermen employed in the net and lobster fisheries along the coast. There has been a decrease of 86 in the persons employed, as compared with 1902. This decrease is most noticeable in Plymouth and Barnstable counties; in Norfolk County there has been an increase from 6 to 33.

Table No. 2 shows, by counties, the number and value of boats and other forms of apparatus employed in the net and lobster fisheries. There were 879 boats, with a value of \$100,-844, employed in these fisheries in 1903; also 163 pound nets and trap nets, worth \$102,195; 1,942 seines, gill nets and fyke nets, valued at \$19,651; 20,121 lobster pots, worth \$25,493.35; and shore property and accessory apparatus, with a value of \$39,345.10. The total investment in these branches of fishery was \$287,528.45. This is an increase over 1902 of \$11,536.05, and over 1901 of \$57,665.85, in the capital invested. Considered in detail, the following changes are shown between 1902 and 1903: there has been a decrease of 56 boats, with a valuation of \$7,149.50 less than last year; an increase of 48 pound nets and trap nets, with an additional value of \$7,965; a de-

* Pound nets are often called weirs, and this is notably the case at Cape Cod where the term pound net is rarely or never used.

crease of 734 in the number of seines, nets, etc., with a shrinkage in value of \$5,564.50 ; an increase of 63 lobster pots, with an increase in valuation of \$603.30 ; and an enhanced valuation of shore property, etc., of \$15,681.75. The increase of valuation of shore property, etc., over 1901, amounts to \$26,074.20.

Table No. 3 shows, by counties and by species, the quantities and values of products. These aggregate 17,865,209 pounds, with a value, at prices paid the fishermen, of \$370,094.16. The catch of 1903 exceeds that of 1902 by 277,742 pounds, and the increase in valuation is \$14,644.75. The details of increases and decreases have been so fully considered under the head of shore weir and net fisheries that reference is made to that chapter for further information.

Mention may be made here that the catch of two pound nets operated by the United States Bureau of Fisheries in Buzzards Bay, for scientific purposes, has not been included in the tabulations. From the returns submitted, it is, however, possible to state the catch of these nets and the valuation of the fish taken. The total catch in the two pound nets was 442,360 pounds, of which 27,984 pounds had no commercial value, and the aggregate value was \$6,264.39. The catch of marketable fish, by species, was as follows : alewives, 400 pounds ; bluefish, 1,382 pounds ; bonito, 5,165 pounds ; butterfish, 8,188 pounds ; flounders, 1,300 pounds ; hake, 100 pounds ; kingfish, 65 pounds ; mackerel, 8,902 pounds ; menhaden, 284,813 pounds ; pollock, 1,701 pounds ; scup, 57,967 pounds ; sea bass, 1,470 pounds ; shad, 3 pounds ; squeteague, 35,035 pounds ; squid, 6,650 pounds ; tautog, 757 pounds ; whiting, 185 pounds.

TABLE NO. 1. — *Showing, by Counties, the Number of Men employed in the Shore Net and Lobster Fisheries of Massachusetts in 1903.*

COUNTIES.	Number.	COUNTIES.	Number.
Essex,	163	Nantucket,	38
Suffolk,	32	Dukes,	120
Norfolk,	33	Bristol,	82
Plymouth,	129	Total,	938
Barnstable,	341		

TABLE NO. 2. — *Showing, by Counties, the Apparatus employed in the Shore Net and Lobster Fisheries of Massachusetts in 1903.*

DESIGNATION.	ESSEX.		SUFFOLK.		NORFOLK.	
	Number.	Value.	Number.	Value.	Number.	Value.
Boats,	155	\$16,578 00	44	\$1,732 00	46	\$5,813 00
Pound nets and trap nets, .	20	10,850 00	-	-	-	-
Seines, gill nets and fyke nets,	180	3,338 50	-	-	6	60 00
Lobster pots,	4,720	5,170 00	3,558	4,023 00	2,604	4,053 00
Shore property and accessory apparatus,	-	2,430 15	-	299 45	-	588 90
Totals,	-	\$38,366 65	-	\$6,054 45	-	\$10,514 90

DESIGNATION.	PLYMOUTH.		BARNSTABLE.		NANTUCKET.	
	Number.	Value.	Number.	Value.	Number.	Value.
Boats,	164	\$13,047 00	287	\$40,596 00	35	\$8,605 00
Pound nets and trap nets, .	-	-	92	69,095 00	2	1,200 00
Seines, gill nets and fyke nets,	72	515 00	1,393	10,189 50	184	2,844 00
Lobster pots,	6,363	9,374 50	1,470	1,636 25	219	189 60
Shore property and accessory apparatus,	-	14,576 10	-	15,046 75	-	540 75
Totals,	-	\$37,512 60	-	\$136,563 50	-	\$13,379 35

DESIGNATION.	DUKES.		BRISTOL.		TOTALS.	
	Number.	Value.	Number.	Value.	Number.	Value.
Boats,	117	\$12,553 00	31	\$1,920 00	879	\$100,844 00
Pound nets and trap nets, .	49	21,050 00	-	-	163	102,195 00
Seines, gill nets and fyke nets,	89	1,149 00	18	1,555 00	1,942	19,651 00
Lobster pots,	1,042	902 00	145	145 00	20,121	25,493 35
Shore property and accessory apparatus,	-	2,875 25	-	2,987 75	-	39,345 10
Totals,	-	\$38,529 25	-	\$6,607 75	-	\$287,528 45

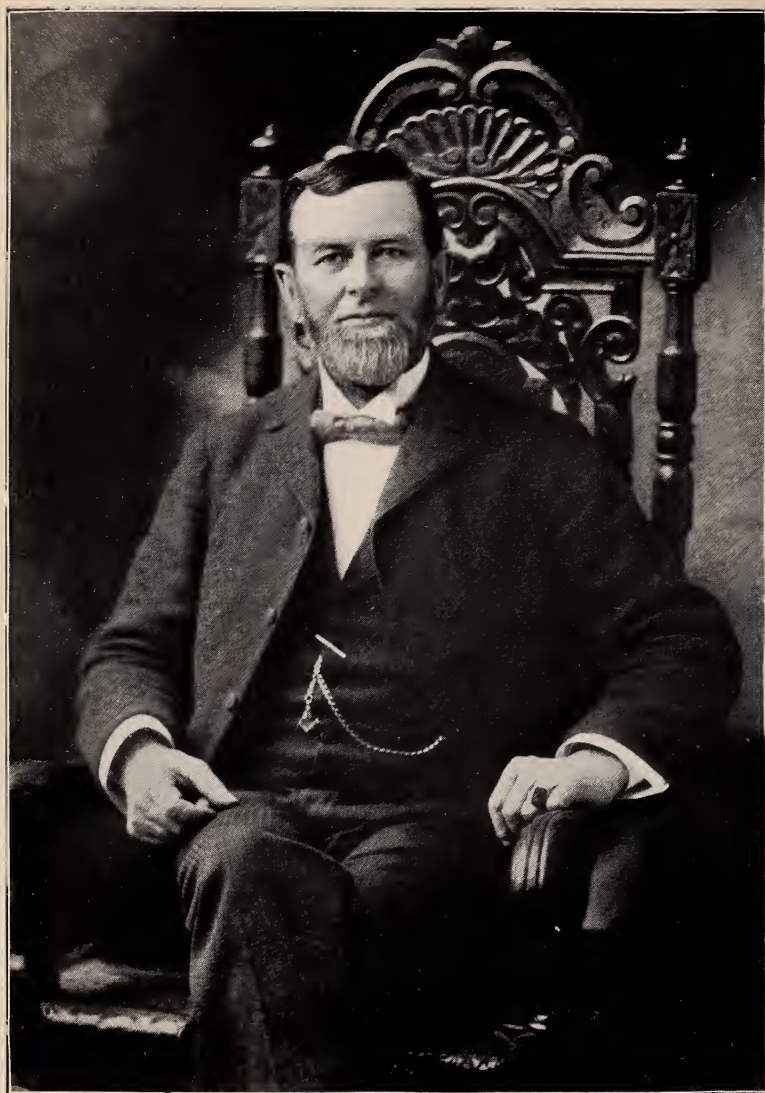
TABLE NO. 3.—*Showing, by Counties and Species, the Yield of the Shore Net and Lobster Fisheries of Massachusetts in 1903.*

SPECIES.	ESSEX.		SUFFOLK.		NORFOLK.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Alewives,	49,100	\$598 00	-	-	-	-
Bluefish,	33	85	-	-	-	-
Flounders and flatfish, .	2,239	24 00	-	-	-	-
Mackerel,	53,484	2,752 80	-	-	-	-
Menhaden,	306,884	1,441 65	-	-	-	-
Pollock,	367,795	1,844 46	-	-	-	-
Salmon,	-	-	-	-	-	-
Scup,	65	3 25	-	-	-	-
Sea bass,	-	-	-	-	-	-
Sea herring,	486,940	16,527 85	-	-	22,400	\$340 00
Shad,	1,607	19 50	-	-	-	-
Squeteague,	15,967	283 51	-	-	-	-
Striped bass,	-	-	-	-	-	-
Squid,	80,645	650 90	-	-	-	-
Tautog,	1,267	17 00	-	-	-	-
Other edible or bait species,	1,557,817	12,487 38	-	-	1,800	180 00
Refuse fish,	-	-	-	-	-	-
Lobsters,	233,848	27,810 39	138,423	\$15,409 95	145,410	15,559 07
Totals,	3,157,691	\$64,461 54	138,423	\$15,409 95	169,610	\$16,079 07

SPECIES.	PLYMOUTH.		BARNSTABLE.		NANTUCKET.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Alewives,	152,000	\$1,475 00	139,755	\$3,104 67	5,200	\$42 93
Bluefish,	10	1 00	21,923	1,233 75	57,817	4,613 81
Flounders and flatfish, .	50	50	1,010,415	24,169 25	147	4 41
Mackerel,	6,449	598 25	435,402	19,960 66	73,380	3,494 92
Menhaden,	2,750	22 50	190,525	927 46	750	3 75
Pollock,	-	-	787,198	10,035 67	22,890	453 02
Salmon,	-	-	19	4 60	-	-
Scup,	-	-	13,762	557 47	8,110	183 03
Sea bass,	-	-	17,789	988 05	4	1 00
Sea herring,	4,000	60 00	2,665,890	27,135 94	-	-
Shad,	50	2 50	886	34 82	-	-
Squeteague,	-	-	1,517,800	30,335 30	44,171	1,097 39
Striped bass,	-	-	8,982	1,389 00	300	40 00
Squid,	-	-	2,526,925	12,717 04	780	15 60
Tautog,	-	-	16,085	300 10	-	-
Other edible or bait species,	500	10 00	2,023,348	20,249 41	75,152	3,061 67
Refuse fish,	-	-	8,000	69 00	210	5 41
Lobsters,	405,509	35,633 52	37,562	5,853 15	7,956	1,171 30
Totals,	571,318	\$37,803 27	11,422,266	\$159,065 34	296,867	\$14,188 24

TABLE NO. 3.— *Yield of the Shore Net and Lobster Fisheries*— Concluded.

SPECIES.	DUKES.		BRISTOL.		TOTAL FOR STATE.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Alewires,	14,957	\$139 53	410,350	\$4,349 44	771,362	\$9,709 57
Bluefish,	1,445	116 90	-	-	81,228	5,966 31
Flounders and flatfish, .	122,640	4,620 03	-	-	1,135,491	28,818 19
Mackerel,	29,252	2,008 96	-	-	597,967	28,815 59
Menhaden,	15,903	199 41	-	-	516,812	2,594 77
Pollock,	2,391	101 20	-	-	1,180,274	12,434 35
Salmon,	-	-	-	-	19	4 60
Scup,	419,615	11,590 75	-	-	441,552	12,334 50
Sea bass,	29,818	1,813 68	-	-	47,611	2,802 73
Sea herring,	9,290	407 00	-	-	3,188,520	44,470 79
Shad,	577	45 69	30,688	1,821 63	33,808	1,924 14
Squeteague,	858,162	28,727 32	-	-	2,436,100	60,443 52
Striped bass,	1,250	35 00	-	-	10,532	1,464 00
Squid,	22,500	317 25	-	-	2,630,850	13,700 79
Tautog,	3,998	122 44	-	-	21,350	439 54
Other edible or bait species,	63,808	2,357 00	2,895	202 00	3,725,320	38,547 46
Refuse fish,	39,500	170 00	-	-	47,710	244 41
Lobsters,	27,646	3,621 80	2,349	319 72	998,703	105,378 90
Totals,	1,662,752	\$56,393 96	446,282	\$6,692 79	17,865,209	\$370,094 16



Yours Very Truly
J. M. Collins

REPORT
OF THE
COMMISSIONERS
ON
FISHERIES AND GAME
FOR THE
YEAR ENDING DECEMBER 31, 1904.



BOSTON:
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CONTENTS.

REPORT.

	PAGE
General considerations,	5
Appropriations,	5
What the State receives,	6
Salient features of the year's work,	9
Ocean fisheries,	13
Notable features of the year,	13
Work of the United States Fisheries Bureau,	16
Shore weir and net fisheries,	20
Mackerel,	21
Pollock and whiting,	21
Bluefish, herring, etc.,	22
Canning alewives, etc.,	23
Capture of lant,	24
Weakfish,	25
Horse mackerel,	25
Dogfish,	26
Shore fishery,	29
Pollock fishing,	30
Beam trawling,	31
Otter trawling,	32
An epidemic among menhaden,	38
Shellfish or mollusk fisheries,	41
Injury to the shellfish industry by sewage pollution,	44
Lobster culture and lobster fishing,	45
The launch "Egret,"	52
Work of the "Egret,"	54
Deep-sea fisheries,	58
Importance,	58
Disasters,	60
Subordination, etc.,	64
Mackerel fishery,	64
The bank cod fishery,	72
Shack fishing,	77
Georges fishery,	80
The market fishery,	81
Inspection of fish,	82
The hatching, rearing and distribution of game fish,	82
Appropriations,	82
Expansion,	84
Output of fish,	86
Frog rearing,	88
The work of distribution,	89
Work at the hatcheries,	90
List of ponds stocked,	101
What ponds shall be stocked,	102
Rivers stocked,	109
Examination of ponds,	109
Massapoag Lake, Sharon,	110
Upper Shawme Pond, Sandwich,	110

The hatching, rearing and distribution of game fish — *Concluded.*

	PAGE
Examination of ponds — <i>Concluded.</i>	
Long Pond, Plymouth,	110
Great South Pond, Plymouth,	111
Ponkapog Pond, Milton,	112
Turtle Pond, Hyde Park,	112
Hoosiewhisick Pond, Milton,	112
Sheep Pond, Brewster,	113
Baker's Pond, Orleans,	113
Goose Pond, Chatham,	114
Deantown Pond, Attleborough,	114
Farmers and Mechanics Pond, Attleborough,	114
Crystal Lake, Haverhill,	114
Great Pond, North Andover,	115
Pearl Lake, or Whiting Pond, Wrentham,	115
Archers Pond, Wrentham,	116
Baddacook Pond, Groton,	117
Crystal Lake, Gardner,	117
Lake Quannapowitt, Wakefield,	118
Packard Pond, Orange,	119
Pottapaug Pond, Dana,	119
Neck Pond, Barnstable,	120
Michaels Pond, Barnstable,	121
Grigsons Pond, Barnstable,	121
Mortality of fish in ponds,	121
Fishways,	123
Prevention of stream pollution by sawdust,	125
Pollution by acids,	126
Pond and brook fishing,	126
Birds and mammals, game birds,	127
Breeding game birds and mammals,	131
Ruffed grouse,	131
At Winchester,	134
Pheasants,	134
Belgian hares,	135
At Sutton,	136
Pheasants,	136
Belgian hares,	138
The fish and game laws and their enforcement,	141
Report of chief deputy,	146
Trout fishing,	147
Game birds,	147
Small game,	147
Deer,	147
Summary of arrests and convictions,	150
New legislation,	150
Courtesies,	156
Obituary, — Capt. Joseph W. Collins,	161
Personnel of the commission,	168

APPENDIX.

A. List of commissioners of the various States,	171
B. Distribution of food fish,	177
C. Distribution of pheasants,	184
D. Distribution of Belgian hares,	186
E. Arrests and convictions,	187
F. Legislation, Acts of 1904,	199
G. Statistics,	210

Commonwealth of Massachusetts.

To His Excellency the Governor and the Honorable Council.

The Commissioners on Fisheries and Game respectfully submit their thirty-ninth annual report.

GENERAL CONSIDERATIONS.

Appropriations. — The amount appropriated for the conduct of the various branches of the commission's work during the current year was \$39,635. Reference is made to the report of the Auditor of the Commonwealth for details relating to the disbursement of the money appropriated.

The assignment of funds for different purposes was designated by law as follows: \$5,630 for compensation of the commissioners; \$2,050 for travel and incidental expenses of the commissioners, including the printing of the annual report, office supplies, etc.; \$780 for clerical services; \$23,375 for enforcement of laws, the propagation and distribution of fish, birds and animals, and for running expenses, rent and maintenance of hatcheries; \$500 for stocking ponds; \$300 for stocking brooks under special act; and \$7,000 for the protection of lobsters with eggs attached.

The increase from last year in the larger item of the appropriation of \$4,930 is due to a recognition of the growing demands of the public upon the commission for work coming under this particular classification. The appropriation of \$7,000 to enable the commission to procure a launch and take other necessary measures for the protection, by purchase or otherwise, of egg-bearing lobsters, was wholly due to a popular demand for such an effort to be made by the State. With these exceptions, and a slight increase in the allowance for printing the annual report, which was insufficient, the other items of the appropriations remain the same as they have been for several years past.

The consideration that the Legislature has given to the recommendations of the commission in the matter of appropriations, as evidenced by the increases made, is gratifying; it shows the development of public interest in and need for the particular work to be accomplished, and a continued confidence in the satisfactory and economical disbursement of public money. As has been stated in our last report, "it is the ambition of the commission to secure the largest results in the public interest for the outlay made," and there is reason for assuming that such are being attained without exception. The chapters which are devoted to the details of the work will emphasize this and make it more clearly apparent. Suffice it to say that the commission is not cognizant of a single dollar that has been misspent.

What the State receives. — There may be doubts in the minds of some who are uninformed regarding the scope and purpose of the work of the commission as to whether the State actually receives adequate return for the outlays made. It therefore seems timely to invite attention here to a few facts. There have been those who have spoken slightly of the effort to protect and increase the game in our covers and the fish in the interior waters of the State; and it has been called "an effort to help out the dude sportsmen," from which the State could not expect to derive any return.

Without considering the question that the most eminent and intelligent citizens of State or nation are sportsmen, within the fullest meaning of that term, and that hunting and fishing are universally conceded to be among the most desirable recreations available to man, — recreations so healthful and alluring that thousands of moderate means heartily and zealously engage in them, — it is, perhaps, worth while to look at the business side of the proposition. Does it pay?

It has been estimated by conservative and careful men, those thoroughly familiar with the subject, that there are resident in this Commonwealth 50,000 persons at least who hunt within its limits sufficiently to be called sportsmen, and as many more who fish for sport. This estimate does not apply to those citizens who seek such pleasures elsewhere.

If, therefore, this estimate is correct (it seems well within

probabilities), we have a basis for another. It may be fairly assumed that, in the event of there being no game to hunt or game fish to angle for in this State, one person in five of those who now find satisfactory sport within our borders would go to Maine or the British Provinces to gratify his desire for fishing or hunting. Granting this conservative assumption, and bearing in mind the widely divergent seasons,—that for fish opening with the disappearance of the ice in spring and hunting being permissible only in the fall,—it is evident that two trips would be necessary; in other words, 10,000 persons would go to fish in spring and summer, and as many more would go in autumn to hunt. This would be equivalent to a trip each for 20,000 persons. The most conservative estimate places the average individual expenditure for such a trip at not less than \$100,—it is seldom so little. It will thus be apparent that the modest effort made by the commission in protecting and increasing fish and game probably keeps within our Commonwealth exceeding \$2,000,000 which otherwise would be expended elsewhere.

The above statements do not take into consideration the benefits derived by the thousands of our citizens who now hunt and fish, and who may not be able to go to Maine or Canada. The advantage to them of having at their own doors the means of indulging in health-giving sports, which invigorate both mind and body, is beyond estimate. Nor has an attempt been made to show to what extent citizens of other States have been attracted here to enjoy our hunting and fishing, with the result that they naturally must expend money; in many instances they have built country homes, some of which are costly, thus increasing the taxable property, and bringing an increased market for agricultural and other local products of the permanent residents.

The commission has recently taken steps to establish more or less important commercial fisheries in rivers by stocking them with shad. Many suggestions have also been made for the benefit of our great ocean fisheries. As an instance, one of these has led to the profitable utilization of sea products that were formerly thrown away. The result this year in this one item alone will doubtless amount to more than double the total

appropriation made for the commission. The adoption of some of the other suggestions has already led to important improvements in actual earnings. Changes that are liable to occur shortly will probably add millions of dollars annually to the income from the sea fisheries of the State.

This statement may not appear visionary, when it is now history that the recent remarkable improvement in our ocean-going fishing vessels, whereby life has been made safer to a wonderful degree, and the earnings have increased to an extent that seems little short of marvellous, was due to the suggestion and example of a member of the commission. The fact that Massachusetts has been able, in recent years, to maintain her position as the premier State in the sea fisheries, is in no small part due to the improved condition of her fishing fleet. If, instead of dreading disaster from foundering in gales, as was often the case in former days, the fishermen of the present have no occasion for anxiety in the open sea, and make their way safely against fierce gales; if, instead of a maximum yearly earning of \$10,000 or \$12,000 twenty or thirty years ago, it is now common for the high-line fishing schooners to make annual stocks ranging from \$25,000 to \$50,000; if the numbers of widowed women and fatherless children, due to losses of men in our fisheries, have been materially decreased, — then there is reason for satisfaction in what has been done to improve our fishing craft. It is likewise a fact that the profitable and important halibut fishery now prosecuted from this State in the Pacific ocean — a fishery that yields an annual return exceeding \$1,000,000, and which is increasing — was established largely because of a suggestion by the same member of the commission. The suggestion is part of the written history of the fisheries.

All this and much more that might be added suggests the possibilities open to a properly conducted department of this kind. It may have the opportunity to return to the public in value many fold what it receives.

There is also reason why we should not be oblivious to matters that are not perhaps so intimately and clearly related to finance. It surely cannot be a valueless service to a State like this, the renown of which is world-wide, that her majesty and honor gain additional lustre because of the better enforcement

of her laws; that the administration of her government is in this regard more highly respected than ever before; and that information respecting matters we have to deal with has been distributed liberally, promptly and widely.

It is, however, for others to determine if the annual saving of millions, the earning of other additional thousands or millions by our citizens, or other results from our work, supply satisfactory evidence that it pays.

Salient Features of the Year's Work. — There has been no halting in the effort to enlarge our work in every direction where improvement or expansion appeared necessary. In rare cases — we believe in only one particular — obstacles that were insurmountable prevented material advance. In every other undertaking gratifying success has been obtained, although it must be confessed that it was secured only because of personal consecration to the work on the part of the commissioners, that admitted of no relaxation for one of them and only one week for the other for the entire year. In other chapters the results will be set forth in greater detail; here it is intended to make only a brief allusion to them.

A new record has been made in breeding and distributing fish, including fingerlings.

We have been less successful than last year in breeding pheasants, due to causes that were unpreventable.

Additional attempts to breed game birds have been made. In one important instance success was attained in a direction heretofore deemed impossible. The rearing in confinement of well-developed, mature ruffed grouse is the first well-authenticated instance we know where this has been accomplished by any official agency in the country. (See page 131.) If future experience demonstrates the feasibility of breeding from birds of this species, raised in confinement and kept within artificial enclosures, a problem of great scientific and economic value will have been solved.

The obtainment of a launch, the "Egret," of suitable size and proper equipment for collecting egg-bearing lobsters, is an attempt in a new direction to prevent the commercial extermination in our waters of the most valuable crustacean known to man. The proper provision made for this by the Legisla-

ture and for the purchase of egg-bearing lobsters evidences an earnest public desire to prevent further depletion of the species. The work accomplished in the brief time the launch was in commission, after her completion, fully demonstrated her fitness and her future possibilities in this direction, when she will have an entire season to carry on her operations. (See page 54.)

The results accomplished by the launch "Scoter" in the enforcement along the coast of the fish and game laws (see page 145) are sufficient evidence of the wisdom of providing such an accessory for our law-enforcing work.

There has not been the slightest indication of any desire on the part of fish packers to resume official inspection of fish. (See page 82.)

The collection of certain fishery statistics has been prosecuted as usual. (See Appendix G.)

The lack of available information upon certain of our shore fisheries, notably the shellfish or mollusk fisheries, is a remarkable instance of neglect of important industries, because of the continuance of old-time conditions, that will be more fully discussed in another chapter. The time seems to have arrived when it should be determined if it is wise for a State so celebrated as Massachusetts is for its learning, wisdom and good government, to longer continue old colonial conditions that practically shut out from official care or consideration industries of large economic and scientific consequence.

Many inquiries have come to this department from distant States and foreign countries respecting our fisheries; in one case at least an official delegation was sent from a foreign land to prosecute a personal inquiry. It is an occasion for satisfaction that the publication in Germany of extensive extracts from one of our reports, together with illustrations, resulted in the sending of experts from that country to study the fisheries of this State. Inquiries have also been made on behalf of the Italian government. Assistance and information were freely given, so far as practicable, but no satisfactory description of the shellfish fisheries was available, and consequently it was impossible to fully supply the data sought for.

We have continued to give such assistance as we could to scientists and scientific institutions, and have received in

return suggestions and information of value to the commission in the prosecution of its work.

For the first time in the history of this department the commission has had a salaried biologist on its staff, — one who has given his attention to various matters of public interest. The limitations placed upon the annual report, however, preclude the possibility of the publication of papers on any industrial subject sufficiently full and complete to make them really instructive and helpful to the public.

We regret the demise of Mr. Thorndike Nourse, who, we are informed, died within the current year in France. He has been a long-time correspondent of this commission, and, at our instance, has actively interested himself in creating a demand in France for American cod roe. Through his efforts the price of this product of our fisheries advanced materially, greatly to the advantage of our fishermen, who would have profited much more than they have done except for the unusual absence of the sardines from the French coast for the past two years or thereabouts.

Notwithstanding the money available for travel was more limited than ever before, due to extraordinary demands elsewhere, and despite the time required for the procurement, outfitting and trial of a new launch, the field work — examination of ponds, rivers, brooks, sawmills, dams, etc. — was prosecuted with a result equal to any heretofore obtained. In some respects it materially exceeded the highest record attained.

Incident to the field work — indeed, a part of it — has been the examination of various sites that were alleged to be suitable for a first-class fish hatchery; for it is increasingly evident that the public demands for fingerling trout and landlocked salmon cannot possibly be met with the means now available to the commission.

No effort has been made to increase the natural history or other collections illustrative of our work, or to add to our reference library, for the simple reason that there is little or no room for specimens or books. Such slight additions as have been made have been the result of pressure, rather than of seeking on our part. Meantime, lack of room prevents the

State from profiting through the generosity of prospective givers, and likewise prevents proper care of material already acquired.

The question of inadequate office room, in which no change has occurred, was so fully discussed in our last report that extensive mention here seems uncalled for. We cannot believe it is wise or advisable to stifle or retard the development of a commission through lack of proper quarters, but there is not at present any apparent remedy in sight for the conditions now existing.

Each year shows a growing demand upon the commission for information of various kinds more or less closely associated with our work. The success heretofore attained in supplying facts, service or material, relating to our work or as a part of our official duties, has apparently led to increased confidence on the part of the public in our ability to meet all reasonable demands, and has caused a consequent increase in demands which have at times taxed our resources to the limit to meet. To the extent of our ability we have most cheerfully complied with every demand, and there is gratification in feeling that it has been our high privilege to satisfactorily serve the public in these particulars. The fact that we have had to seek information, and even to procure drawings, from foreign countries to meet the requirements of our citizens is an additional cause for gratification, especially if what was done aids in the procurement of more satisfactory conditions in the affairs most intimately concerned.

There is a continuously increasing demand for the documents issued by the commission, especially in the matter of annual reports and pamphlets or posters containing fish and game laws. We can repeat with emphasis that which we said last year: "Compliance with it is a matter of public necessity." We have gone to the extreme limit of our resources, or beyond, in our effort to supply this demand; but the best we have been able to do only demonstrates the fact that what seemed ample a year ago is insufficient now. Besides this, the cost of printing is increasing, and the money that would accomplish requisite results of this kind heretofore will no longer suffice for the same purpose.

There has been a continuous development in recent years in the law-enforcing effort, and in perfecting the organized salaried force for actively prosecuting this work. As a result, it can safely be stated that never before in the history of the commission has there been available so highly organized and efficient a force as now, and never before has such effective work been accomplished in the enforcement of the fish and game laws. We simply take the number of arrests and convictions as the sole standard for consideration. This is all the more remarkable, in view of the fact that in some regions of considerable extent violations have been reduced to a minimum,—an additional evidence of the satisfactory enforcement of law. The increasing popularity of this effort is indicated unmistakably by the large numbers of men of varying trades and professions who have sought appointments as unsalaried deputies; their desire to see the fish and game properly protected has apparently been their only motive in seeking such an office.

As will be seen in succeeding chapters, the commission has undertaken preliminary studies of some matters which may lead to a more complete utilization of our interior water resources, or which otherwise invite attention to information helpful to our citizens.

OCEAN FISHERIES.

Notable Features of the Year.—Perhaps the phenomenal scarcity of the dogfish (*Squalus acanthias*) on the fishing grounds frequented by our market fishing vessels, and in the waters bordering this State, has been one of the most remarkable features of the sea fisheries in a century. It is all the more noteworthy because at the last session of the Massachusetts Legislature a resolution was passed, calling upon the Congress of the United States to “protect the food fish of our coast from these sharks or dogfish.” This action was due to an abnormal abundance of dogfish during the previous year, a continuance of which, with the consequent harmful influence on the fisheries, was dreaded; nevertheless, the action of the Legislature has probably seldom, if ever, been paralleled so far as the fisheries are concerned.

The excessively cold winter at the beginning of the year was out of the ordinary, and, aside from the consequent increase of hardship and suffering to the fishermen, it had a marked influence upon certain branches of fishery prosecuted in mid-winter. Not only were vessels frozen in port, but they were sometimes exposed to peril because of being caught in ice fields or newly frozen ice outside of harbors. Instances of men freezing to death in their boats were not unknown, and altogether the fishermen were exposed to unusual interference and dangers.

The year has been noteworthy for a remarkably small catch of cod on the banks, and especially on the eastern fishing grounds.

The large catches of shad in Ipswich Bay are said to have been unprecedented in that region.

The establishment of cold-storage warehouses on T wharf, Boston, by some of those dealing in fresh fish, appears to be an important progressive step in the fresh-fish trade.

The year has seen many additions of first-class sailing vessels to the ocean-going fishing fleet. The number added to the Boston market fleet has been larger than common, and, as a rule, the schooners have been large and of superior designs.

No steamer of considerable size has been employed in the Atlantic deep-sea food fish fishery, although small steamers and naphtha boats have been added to the inshore fishing fleet. The loss of the "Alice M. Jacobs" at Newfoundland near the close of 1903 detained her owner and master, Capt. Solomon Jacobs, so long in looking after the wreck and settling affairs incident thereto that there was no time to build another steamer before the opening of the spring fishery. What the future will bring remains to be seen.

It is remarkable that the whiting or silver hake (*Merlucius bilinearis*), which formerly was a waste fish and was thrown away as of no value, has recently become one of the most important species taken in the Cape Cod weirs. While it is cheap in price, it is usually abundant, and the extensive sale of it has been an important factor in the weir fishery. Those prominently identified with this fishery have stated that the conditions this year were such that, except for the income

resulting from the sale of the whiting, the industry could not have been profitably pursued. In late October it was the *only* product of any consequence that was being taken in the weirs at North Truro and vicinity.

It is difficult to get at the exact amount of whiting that have been saved and sold, for the reason that they come under the head of "other fish" in the returns submitted by the fishermen. This is due to the fact that the species was of little consequence as a factor in the shore fisheries until very recent years. From what information comes to us, however, it seems probable that the total amount marketed largely exceeds that of last year, when 2,500 barrels were frozen at Truro and Provincetown toward the close of the season, and when, according to expert information that came to us after the publication of our report, the aggregate quantity of this species sold was fully 14,000 barrels.

We are advised that the price of whiting is considerably influenced by the large quantities of this species taken on the New Jersey coast and frozen in refrigerators. Being near the great metropolitan markets of New York and Philadelphia, the New Jersey fishermen not only are able to supply much of the demand, but they can command for their product a larger price than the more distant fishermen on our own coast can secure. The whiting is a species which is peculiarly dependent upon prompt transportation and nearness to markets, when sold fresh; hence the advantage of New Jersey over Massachusetts in this particular.

The utilization for bait of large quantities of the sand eel or lant (*Ammodytes americanus*) by the off-shore fishing vessels is an innovation, and one which has proved largely advantageous to the fishermen. These little fish, which are well known to be a favorite food for the cod and allied species, occur in great abundance in Cape Cod Bay at certain seasons. In the spring quantities of them are taken in the weirs or pound nets. Because of their size and eel-like shape they pack together very closely, consequently a certain number of barrels of them will go farther for bait purposes than the same quantity of fish of other species. For this reason, and also because they are attractive to the cod, they make desirable bait. The addition

of this species to our native bait resources is a matter of some moment, for when it is obtainable at home in large quantities, as it has been this year, and our fishermen have learned to utilize and appreciate it, we are to that extent increasingly independent so far as a bait supply is concerned.

The attempt of the authorities of the United States Treasury Department to collect revenue on the brine in which foreign-caught fish were imported into this country was one of those incidents which showed a startling lack of information concerning fish and fisheries on the part of government officials. While this decision more directly affected trade in imported fish products, and might not be seriously considered by those not directly interested in such commerce, the dense ignorance of the fisheries indicated by such action suggests how these industries may at any time be menaced or even seriously injured because of lack of information. It is inconceivable that brine, which has no food value, should have had a tariff assessed upon it, — an action never before taken since the art of curing fish with salt was discovered by a Dutchman hundreds of years ago. The protests of the press and people soon corrected the mistake, however, for the decision was promptly revoked, when it was seen that a grave injustice had been done to those prominently concerned in fish trade.

Although the year may not justly be considered a successful one, when considered from the standpoint of the aggregate quantities of fish landed, and while the yield of certain important fisheries has been considerably less than the average, the earnings have been fair, and those of some of the vessels have been large, if not extraordinary.

Work of the United States Fisheries Bureau. — At the opening of the fiscal year, beginning July 1, 1903, the United States Fish Commission which, since its organization in 1871, had been an independent and unattached bureau of the federal government, became a part of the Department of Commerce and Labor, and its official title was changed; it is now known as the United States Bureau of Fisheries. There has been no change, however, in its functions or belongings. As a consequence, the two important fish hatcheries of the United States on the coast of this State continue without change the

efforts heretofore made to increase the sea species of food fish and crustaceans off our shores. Thus the annual planting of millions of fry in our waters, which has been of yearly occurrence, still goes on. According to detailed statements furnished by Hon. George M. Bowers, U. S. Commissioner of Fish and Fisheries, the aggregate output of fish and lobster fry from the two stations for 1904 has been 416,179,000, which exceeds the production of 1903 by 20,891,000. The increase is wholly in lobster fry, for there is a falling off of 31,838,000 fry in the production of fishes. But, while the entire yield of fish fry went into our waters, as will be seen, the plant of lobster fry along our coasts was considerably less than half the output, being 42,942,000, as compared with 63,940,000 that went into the waters of the neighboring States, from which the egg-bearing lobsters had been mostly obtained. The total output of fry in the waters of this State was 352,239,000, which was 13,677,000 less than was planted off our shores in 1903 from the same stations. Of this amount, 79,455,000 were cod, 228,272,000 were flatfish, 1,246,000 were pollock, 324,000 were mackerel and 42,942,000 were lobsters.

The production of cod fry was even less than in 1903, which was much below the average. This result must justly be attributed to the unusual severity of the weather during the cod-hatching season in the early part of 1904. The winter of 1903-04 has rarely been equalled for long-continued cold and severe gales. These conditions not only made it difficult to fish on the in-shore grounds, but even when the fish were caught the extreme temperature was liable to chill and kill the eggs, while frozen harbors brought all the difficulties of frozen-in fleets, anchor frosts and the consequent death of adult gravid fish held in confinement until their eggs would be available.

The result of hatching flatfish of various species was but a little short of that of the year previous. It is only necessary to repeat that the work is timely, and may be of large consequence in securing the continuance of the abundance of species which are now beginning to attract the attention they are justly entitled to.

The hatching of pollock, which was apparently not prose-

cuted in 1903, has received some attention this year. On the other hand, tautog, scup and sea bass, more or less of which were artificially propagated in 1903, do not appear to have been hatched in 1904, so far as the returns show. The output of mackerel fry, however, although small, exceeds that of last year by a few thousands.

The aggregate yield of lobster fry exceeds anything accomplished in recent years, and the number planted in the waters of this State is the largest for some time. This is due to various reasons. In the first place, the facilities for collecting egg-bearing lobsters have been increased materially, especially on the coast of Maine, and long experience in the work has brought more satisfactory results. By authority of law, the Commission on Sea and Shore Fisheries of Maine has heartily co-operated with the United States Fisheries Bureau in the collection of egg-bearing lobsters, thereby increasing the supply of available eggs for propagation. Inasmuch as all these eggs had to come to the hatcheries at Woods Hole and Gloucester for incubation, and also because more or less egg-bearing lobsters were shipped to the Boston dealers from Nova Scotia in the course of trade, but were sold to the Fisheries Bureau, the ordinary receipts of lobster eggs were much enlarged, with a consequent greater output of fry. The following tabulated statement, furnished by the Bureau of Fisheries, shows in detail and with exactness the number of fry of each species, including the lobster, planted in the coast waters of this State, and the points along the coast where they were liberated : * —

* This statement does not include the distribution of lobsters along the coasts of Maine and New Hampshire, — almost wholly in Maine waters, — since those data properly belong elsewhere.

Statement of Sea Fish and Lobsters hatched and planted in Massachusetts Waters by the Gloucester and Woods Hole Stations of the United States Fisheries Bureau, during the Fiscal Year ending June 30, 1904.

SPECIES AND DISPOSITION.	Fry.
<i>Cod.</i>	
Atlantic Ocean, Gloucester, Mass.,	35,376,000
Vineyard Sound, off Tarpaulin Cove, Mass.,	24,076,000
Vineyard Sound, off Jobs Neck, Mass.,	4,363,000
Vineyard Sound, off Lackeys Bay, Mass.,	1,002,000
Vineyard Sound, off Woods Hole, Mass.,	587,000
Woods Hole Great Harbor, Woods Hole, Mass.,	12,353,000
Eel Pond, Woods Hole, Mass.,	322,000
Buzzards Bay, off Weepecket Island, Mass.,	1,376,000
<i>Flatfish.</i>	
Great Harbor, Woods Hole, Mass.,	53,476,000
Great Harbor, Falmouth, Mass.,	35,723,000
Eel Pond, Woods Hole, Mass.,	926,000
Woods Hole Little Harbor, Woods Hole, Mass.,	2,097,000
Atlantic Ocean, Gloucester, Mass.,	124,615,000
Waquoit Bay, Waquoit, Mass.,	3,349,000
Buzzards Bay, off Weepecket Island, Mass.,	8,086,000
<i>Pollock.</i>	
Atlantic Ocean, Gloucester, Mass.,	1,246,000
<i>Mackerel.</i>	
Woods Hole Great Harbor, Falmouth, Mass.,	135,000
Vineyard Sound, Falmouth, Mass.,	189,000
<i>Lobster.</i>	
	324,000
Atlantic Ocean, Gloucester, Mass.,	22,350,000
Atlantic Ocean, Manchester, Mass.,	3,450,000
Atlantic Ocean, Rockport, Mass.,	3,650,000
Atlantic Ocean, Marblehead, Mass.,	1,400,000
Atlantic Ocean, Beverly, Mass.,	1,100,000
Atlantic Ocean, Lanesville, Mass.,	800,000
Vineyard Sound, Falmouth, Mass.,	2,088,000

Statement of Sea Fish and Lobsters hatched, etc. — Concluded.

SPECIES AND DISPOSITION.	Fry.
Woods Hole Great Harbor, Falmouth, Mass., . . .	1,979,000
Buzzards Bay, Falmouth, Mass., . . .	5,033,000
Buzzards Bay, Gosnold, Mass., . . .	367,000
Hadley Harbor, Gosnold, Mass., . . .	215,000
Ipswich Bay, Newburyport, Mass., . . .	500,000
	42,932,000

The fry of fresh water species obtained by this commission from the Bureau of Fisheries for stocking interior waters are mentioned in detail elsewhere. But, aside from these, the hundreds of millions of young fish put into our coast waters is a work which deserves consideration on the part of those so largely engaged in the commercial fisheries as are the citizens of this State. Indeed, whatever tends to maintain or increase the supply of available food that can be taken from the water is a matter of no small moment to all, and is worthy of considerate attention.

Shore, Weir and Net Fisheries.

The beginning of the year was a time of anxiety for the weir fishermen of Cape Cod. Those who had left their nets in the water the previous winter occasionally made catches of herring which yielded a profit; inasmuch as the weather was not severe, and there was little ice going, no great risk was incurred. The result encouraged a repetition of this venture this year. But the conditions met with differed materially from those of the year before. Temperatures ran low early in the winter, and at the very first of the year ice had formed extensively in Cape Cod Bay, and menaced the existence of the weirs which had not been taken up. A Provincetown despatch, published in the Boston "Herald" of Jan. 17, 1904, said:—

Weirman are working like horses to-day, getting netting and poles from the sea at the east end of the harbor with all speed; for the great ice floe that has lain at the head of Cape Cod Bay the past

fortnight has cut loose from its sandy dock, and is slowly forging hitherward along the Truro shore. Already it is abreast the south portion of that township, covering the waters where weirs and scows were maintained until a couple of weeks ago, and, pushed by a freshening souther, is fast approaching Provincetown, threatening to demolish such big fishing weirs as are standing to-night.

The result of this condition was to suddenly eliminate the winter fishing with fixed apparatus of this kind, and the continued severity of the weather did not admit of any premature building of weirs in the spring.

Mackerel.—The continued absence of the mackerel from in-shore waters, or at least the absence of large bodies of fish of this species, while remarkable, is only an additional evidence of the well-known habits of a species noted always for its unreliability. Why it left the waters where it could be captured in weirs, pound nets or gill nets set near the land, the wisest can only conjecture; why it has stayed away so long is a matter of pure speculation; and when it will return in-shore in its old-time abundance none can tell. We are aware that “explanations” are in evidence and predictions are not wanting, but such have never been lacking under such circumstances; they may be reasonable, but they are generally far otherwise. The few mackerel that have been taken in weirs, etc., are only a suggestion of what may sometime happen; but when, no one can tell.

Pollock and Whiting.—A marked feature of the weir fishery this year has been the larger captures of pollock and whiting. Both of these species are exceedingly voracious, and their pursuit of smaller fish takes them in-shore and naturally makes them liable to capture in the weirs, as pound nets are termed at Cape Cod. As already stated, the whiting has recently become of large consequence, and the prosperity of the weir fishermen now seems to depend somewhat upon the capture of a species formerly considered scarcely worth saving, or that was actually thrown away.

Capt. Atkins Hughes, who has the general management of the pound nets at North Truro, writing on July 14 in relation to the catch of the weirs in that vicinity, said, among other things: “The stock of the weirs in Truro and Provincetown

up to this time has been an average one, but it has been mostly for pollock and whiting."

In view, too, of the fact that it is not so long ago since the horse mackerel was looked upon as unfit for food, it is somewhat gratifying to be informed that two medium-sized fish of this species which were taken on June 25 in the Cape Cod weirs and shipped to New York were sold for \$43.50, — an indication of the position which this species now occupies in the food fish market.

Again, in a letter received Oct. 18, 1904, he stated that: "The larger part of the stock was from pollock and whiting. . . . at present whiting is the only fish being caught here."

We know from personal observation that the whiting is commonly served to the guests of the Cape Cod hotels under the name of perch, although it is vastly superior as a pan fish to any perch in our waters.

It was also learned that the demand for the whiting this year was far in excess of anything in previous years, and that practically the entire catch of this species now meets with a ready sale. Information was obtained of several shipments of pickled salt whiting put up in barrels similar to mackerel. These were sent to one of the southern States, from which at least three or more successive orders had been received, the combined orders aggregating several hundred barrels. At the time of the late chairman's visit a Gloucester schooner lay in the harbor of Provincetown, and was daily receiving and curing whiting for a firm in Gloucester, prominently identified with the smoked fish trade. The fish were sold by the weirmen as they came from the water for \$1 per barrel, but so great was the catch that the money obtained for them constituted a considerable percentage of the receipts of the weirmen. One who was prominently identified with weir fishing said that: "Except for this whiting and what we get for it, we could not now carry on the weir fishery with profit."

Bluefish, Herring, etc. — According to Captain Hughes, there have been no bluefish taken in the weirs, although they have been abundant elsewhere; only a few butterfish were caught, and the take of sea herring was the smallest for many years.

The failure to make the average capture of bluefish in fixed

apparatus, contrasted with the reports of unusual abundance of this fish at Nantucket and other near-by localities, would appear remarkable if the scarcity or absence in one place and plentifulness in another were not so completely in harmony with the well-known habits of this particular species. Similar examples of unexplained phenomena in connection with the bluefish could be cited, practically without limit; but all that is proved thereby is the lack of knowledge of its migratory habits, and the impossibility of controlling or of accurately forecasting its appearance in any particular locality.

As an example of the presence of bluefish on some sections of the coast of this State, the following despatch from Nantucket, on July 18, 1904, published in the Boston "Herald" on the following day, may be quoted: —

To-day has been one of the greatest bluefishing days in the history of Nantucket, and sportsmen, hand liners, seiners and steamers all have reaped a bountiful harvest. The total day's catch is upward of 1,500 fish, the largest fare being 340, made by two dories manned by John P. Taber, Asa F. Meigs, Clinton Orpin and Edward Whiden, who made the big catch inside of three hours. The fishing continued long after dark.

Bluefish also appear to have been in Buzzards Bay in considerable numbers this year, and catches much larger than common in recent years were made. This return of the bluefish to the waters of that section of the State, after almost a complete absence, is exceedingly gratifying.

Canning Alewives, etc. — While on a trip to Cape Cod the late chairman had an opportunity to visit a canning establishment at Provincetown, where he learned that considerable business was being done in canning alewives, of the species commonly called "kyacks" by the fishermen, that were caught in the local weirs, and taken to the packing establishment each morning. These are labelled as "mackerel" and "trout," which is a misrepresentation of the species; but, as the fish are packed when in the very best condition, they make a very palatable and desirable food, which can be placed on the market at a minimum price, and for that reason such products are valuable to people of moderate means.

In this connection it is important to note that the Dominion government, in addition to subsidizing three plants for rendering fish offal and dogfish, have started also an experimental station for catching and curing herring after the Scottish fashion. This work is under direct charge of Mr. John Cowie, the Scottish herring expert, and his staff of trained herring curers. The government bought in Yarmouth, Eng., for this purpose, the steam drifter "Thirty-three," for use in active operations to determine whether Canadian herring can be cured to equal Scottish herring, which are now the favorite in the American markets. The steam drifter is fitted with all the appliances used in the North Sea. She will be used to catch herring all along the Nova Scotia coast, and the fish will be cured at Canso. If this experiment proves successful, it will add at least a million dollars to the annual value of Nova Scotia's herring catch, on account of the improved methods of treating fish, and thus making them equal in price to Scottish herring.

Capture of Lant. — As already stated, there has been a marked change in the catch of the weirs, as will appear in the statistical tables, to which reference is made for details.

Among the innovations in the weir fishery there have been few of greater consequence than the capture of large quantities of the lant or sand eel for bait, to be used by the schooners engaged in the deep-sea fisheries. As indicative of the extent to which these little fish are caught at Cape Cod and their value for bait, we quote the following extracts from a letter written to the late chairman on June 24, 1904, by Mr. W. Irving Atwood of Boston, who is largely interested in weir fishing. He said: —

Some little time ago I was talking with you in regard to the catching of sand eels in the traps at Provincetown and using them for bait. I have been able to get the amount of eels caught by three of the traps at Provincetown during the months of April and May, 1904. The trap which we will term No. 1, caught 390 barrels; No. 2, 350 barrels; No. 3, 275 barrels; making a grand total of 1,015 barrels.

When you consider the fact that one barrel of eels is the equal [for bait purposes] of three barrels of herring, you can see the enor-

mous benefit that eels have been to the fishing vessels. A single baiting of eight or ten barrels of sand eels will, in three days' time, catch fish enough for the vessels to stock \$800 to \$1,500 each. Many of our fishermen at Provincetown realize that, owing to the scarcity of herring, had there been no sand eels the entire [deep sea] spring fishery would have been a total failure; where, as the fact stands to-day, many of them have made the best spring's work that they have had for years.

We are also informed by these same fishermen that usually when they use herring they are unable to catch a trip of fish, on account of that pest of all the fishermen, the dogfish; but that in using the sand eels the dogfish trouble them very little. Sand eels are now making a reputation for themselves in the haddock fishery, but are not considered as good bait as the herring in the cod fishery.

Weakfish.—The continued abundance of the weakfish or squeteague on the northern coast of this State is one of those unexplainable phenomena of which the migratory species of fishes furnish so many examples. How long it may remain plentiful can only be conjectured, and its sudden departure, in whole or in part, is one of those events which may occur at any time.

Horse Mackerel.—The horse mackerel, which has not been plentiful as usual for the past two or three years, appeared this year in considerable numbers, but its stay was fluctuating. Periods of abundance were followed by days or weeks when no fish of this species were caught or seen. We had personal evidence of this. Horse mackerel were reported plentiful about the middle of July. As indicative of this, the following item, which appeared in the Boston "Globe" of July 22, 1904, shows that the market was overstocked with this species:—

Horse mackerel are not only flooding the market, but the fishermen complain that they are driving bluefish, weakfish and mackerel out of the bay. The huge fish is a lightning swimmer, and, with its enormous capacity and voracious appetite, is never satisfied, and will clean up a good part of a medium-sized school of mackerel at a feeding. No small or medium fish that is alive is refused by the horse mackerel when on a search for food.

Wholesale dealers are obliged to keep them on hand, as the demand for game fish is increasing. They are expensive fish to keep, how-

ever, as they contain a great deal of oil, and spoil quickly, even when kept well covered with ice. Experienced dealers say that no fish received in this market uses up ice in such quantities as the horse mackerel.

The late chairman, while at Provincetown near the close of the month, felt that it might be an important matter to catch one on a hook and line by trolling, since the capture of a "Leaping Tuna" in this manner in Cape Cod Bay would doubtless be of much interest to anglers, and, incidentally, might lead to the distribution of more or less money in the locality by those who might go there to angle for this large, active fish.

Through the courtesy of Capt. R. E. Conwell of Provincetown Captain Collins had an opportunity to make such a trial on July 30. Captain Conwell furnished all the desiderata, — a power boat such as is used in the weir fisheries, line and bait. He also managed the boat, giving the opportunity to troll on a fine morning over an area of ten or twelve miles. Unfortunately, however, there were no indications of the presence of horse mackerel in the bay that morning, and all signs, including lack of capture in the nets, suggested the entire absence of the species. Thus, although hooks freshly baited with new herring were towed four hundred feet or more behind the boat for hours, there was not even a strike of any kind.

Dogfish. — The problem of dogfish along the coast is a serious one. The solution is to be found in some method of utilizing the bodies, and in some concerted effort through and by the fishermen to prevent the liberation of any dogfish or shark which may be captured on hook or in nets. The dogfish is a migratory creature, and we cannot argue from experience in the past years that the present abundance or scarcity of dogfish on the coast will be continued. The economic point is that the dogfish is a creature which takes fish which could be more profitably used by man, and thus is without question one of the great enemies of fish and fishermen. Measures looking towards the utilization of the dogfish are, therefore, on proper lines. The methods which thus far appear available are, first, the reduction to oil and fertilizer in special plants. The Canadian government has already subsidized three such plants, one in northern New Brunswick, another on the south-eastern

coast of Cape Breton Island, and the other on the Magdalen Islands. The Canadian government has also made tests to ascertain whether salted dogfish can be used for bait, with what results we are not yet informed.

The commission appointed by the Dominion government has also reported in favor of a bounty of one and one-half cents upon every shark tail. The dogfish are excellent as food, when fresh or canned; and the only reason at present why they are not used is the abundance of other fish. It seems, however, that some systematic efforts might be made to utilize dogfish as food for men or animals, as a protein-containing constituent of desiccated meal or biscuits. It seems that co-ordinate action should be taken by the American government, along similar lines to that of the Dominion government, as without question uniform legislation is of prime importance. There is no doubt that the dogfish has inflicted enormous losses upon the shore fisheries, particularly during the summer, when the demand for sea food is brisk and prices high. More than that, it has caused a loss of thousands of dollars in fishing gear, and driven out of employment thousands of men who usually find a remunerative means of support in the shore fisheries, and by so doing reduce the cost of fish to the consumers. The Bangor "Commercial," early in August, refers to an instance at Owl's Head, Me., where a fisherman set 1,500 hooks, and on which, on pulling his lines, he found about 1,000 dogfish. The mere killing of these required hours of time. There seems to be some evidence that the dogfish are increasing in numbers on our coast. Only within very recent years have the fishermen taken the trouble to kill as many as possible, but have turned them loose, freeing them from the nets with as little damage as possible.

There is now comparatively little of the catch of the weirs or pound nets that is not utilized for either bait or food. Unfortunately, however, there is yet no satisfactory market for dogfish, which in seasons of abundance are taken in large numbers. Efforts are being made elsewhere to introduce them for food, we believe as a result of suggestion made by this commission; and the day may not be distant when dogfish, both salt and fresh, may become a part of the food fish supply,

and to that extent a benefit to the fisheries, instead of a curse, as heretofore. If it can be utilized fresh, salted, smoked or manufactured into a fish meal, or used as an ingredient of poultry food, it will be a cheap and usually abundant product. Many, especially those who are natives of southern Europe, may prefer it to the higher-priced fish of other species. If so, the result will be satisfactory, and a heretofore waste product will be put to a good use.

The New York "Fishing Gazette" of Oct. 29, 1904, editorially mentions the fact that a St. Johns, N. F., firm "are splitting and salting dogfish for market."

There have been numerous press notices of attempts by the Canadian government to utilize salted dogfish for lobster bait, — attempts that have been ridiculed by a few old fishermen, so it is said, but which, nevertheless, may prove satisfactory.

According to the Boston "Globe" of Oct. 28, 1904, attempts have been made by Nantucket fishermen to market the dogfish for food. It says: —

What will mean a source of large income to the fishermen here, if successful, is the shipping to the New York markets of dogfish, a portion of which, it is understood, is cut into steaks, and sold as a species of white fish. . . . The captain states that only fish of more than 2 feet in length are salable. He says his crew will receive 10 cents each for them.

The Japanese, from whom we have much to learn in the utilization of the wealth of the seas, eat such fish. It has been said: —

Among their commonest, cheapest and most wholesome food fishes are sharks, which are brought into the markets and butchered much after the manner of beeves in our own country. . . . For some reason we do not knowingly eat sharks, and in this we miss a great deal. As some people are doubtless aware, the dogfish, which appear in such immense droves on our east coast and are so destructive to other fish life, are excellent when fresh or canned; and I predict . . . the day when these and other sharks will be regularly seen in our markets.*

* Gloucester "Times," Oct. 13, 1904.

From the foregoing it will be seen that not only is the dog-fish suitable for food, but that the people in this country, Canada and Newfoundland are taking intelligent action to utilize it, in one way or another.

Shore Fishery.—There is little that is new in the shore boat fishery, carried on for the most part with power-driven dories. It is true the numbers of these have increased, naphtha dories being substituted for sail boats; and in this way the fleet of small craft is gradually being changed, so that greater effectiveness, larger catches and consequently larger earnings are becoming more general than formerly. Probably the changes in this direction are less in evidence at Cape Cod than elsewhere. At Cape Ann, for instance, — Gloucester, Rockport and adjacent coast towns, — there is a very general adoption of the power-driven boat for various kinds of fishing, and a consequent decrease in sail boats. Large power dories, specially built for the purpose, generally with a sort of cuddy aft, are peculiarly adapted to the herring fishery, which is prosecuted extensively on autumn nights by torching. Such boats can make immensely larger catches than the old-fashioned oar-propelled craft, and can quickly transport the product to a market, where the fish arrive while new, fresh and bright. The demand for such herring, which are mostly used for bait, is much greater and more certain than when less expeditious methods could be used, and consequently the bait fish often were much older than they now are when they reached their destination. This being the case, and it also being true that the herring naphtha boats now employed can carry a much larger cargo than the boats formerly used, it follows that the power dories have practically occupied the field in this line of industry, while they usually engage in different branches of fishery at other seasons. Many of the so-called “shore boats” — those employed in the general fishery for cod, haddock, etc., on the fishing grounds not far from land, and which usually make daily trips — have had gasoline engines put into them for auxiliary power, and some of the craft thus engaged in shore fishing rely solely upon power motors. Those at Gloucester who go out in boats to gather certain fishery products from incoming schooners, who are usually denominated “stream

buyers," now use power boats, instead of the ordinary dory formerly employed.

It has been asserted that the Nantucket fishermen have rarely if ever done so well as this year. The prevalence of northerly winds in the fall enabled them to launch their dories and to return safely to the harborless shores on the south side of the island to a larger extent than common. And, inasmuch as fish were reasonably abundant on near-by grounds, the catch was larger and more remunerative than usual.

Pollock Fishing.—The hand-line fishery for pollock by boat fishermen appears to have assumed unusual proportions this year, partly, perhaps, because of the adoption of a new idea in the method of fishing for them. Ex-Representative Robert E. Conwell of Provincetown is authority for saying that the system of trolling for sea pollock, which was suggested by our late chairman, has recently been adopted by the Cape Cod fishermen with much success. "Last spring," he said, "it was interesting to watch the fishermen sailing back and forth through the tide rips off the Race in their power boats, and pulling in big sea pollock on their troll lines as fast as they could haul. Sail boats were also used in this fishery to some extent, but they were not so well adapted to it as the naphtha dories, which could work back and forth very handily through the rips, so that no time was lost." We also understand that this system of fishing—called "drailing" on Cape Cod—is somewhat extensively prosecuted from other sections of the Cape, notably at Chatham, since it is claimed that some of the best fishing grounds are the shoals to the south of that town, in the vicinity of Pollock Rip.

Aside from the interest usually attending a fishing trip, "going out for pollock" has in it an element of sport not common to the prosaic work of gathering in the sea treasures for commercial purposes.

Boats engaged in this work leave their Provincetown moorings early, if practicable, the time of departure depending more or less upon the state of the tide and the hour when the neighboring weirs will be "lifted," since it is upon the latter that the hook-and-line fishermen depend for bait. Once the bait is on board, and the hooks, drails and lines ready, the

boat is headed for the fishing ground under full speed, and away she drives past Long Point, Wood End and beyond the Race, leaving all on the starboard hand. A little beyond the Race Point lighthouse the rips are reached, and there are the favorite feeding grounds of the pollock in spring. Then the lines are put out, and back and forth the boat sails, an effort being made to keep where the fish are most plentiful. As is well known, the pollock is active and gamey, and when it is biting freely the capture of it in this manner necessitates lively work, for it is haul and heave as rapidly as possible. To pull in hundreds of fish as big and active as large salmon gives an amount of sport not easily equalled elsewhere, while the remuneration gained from such good fishing is an element that gives additional zest to those who can afford to consider only the commercial side of such experiences.

It is, perhaps, unnecessary to invite attention to the amount of sport to be derived by the angler from fishing for pollock with rod and reel, when they are playing in the rips in spring. An angler of wide renown has recently called attention ("Forest and Stream," July 23, 1904) to the fact that at a place he was visiting "the sportsmen were depending largely on the pollock for recreation;" and he declares, as a result of personal experience, that it "gives as good sport when handled with rod and reel as can be desired." It is gratifying at least to know that such an excellent opportunity for satisfactory sport in fishing is available on our coast, and within easy reach of the many anglers who are resident in large cities. One who has participated in the pollock fishery at Cape Cod says: "Half an hour of good fishing is sufficient to give the amateur enough sport to recompense him for all the trouble of going from the city and getting up at 4 o'clock in the morning, — even though the bay is then as silver in the sunrise." *

Beam Trawling. — The beam trawl fishery at Cape Cod has been prosecuted as usual, and, notwithstanding there is nothing like a boom in this, the industry is a well-established one, and has had a gradual, healthy development since its inauguration about seventeen years ago, as a result of the publication of a treatise on beam trawling that was prepared by our late

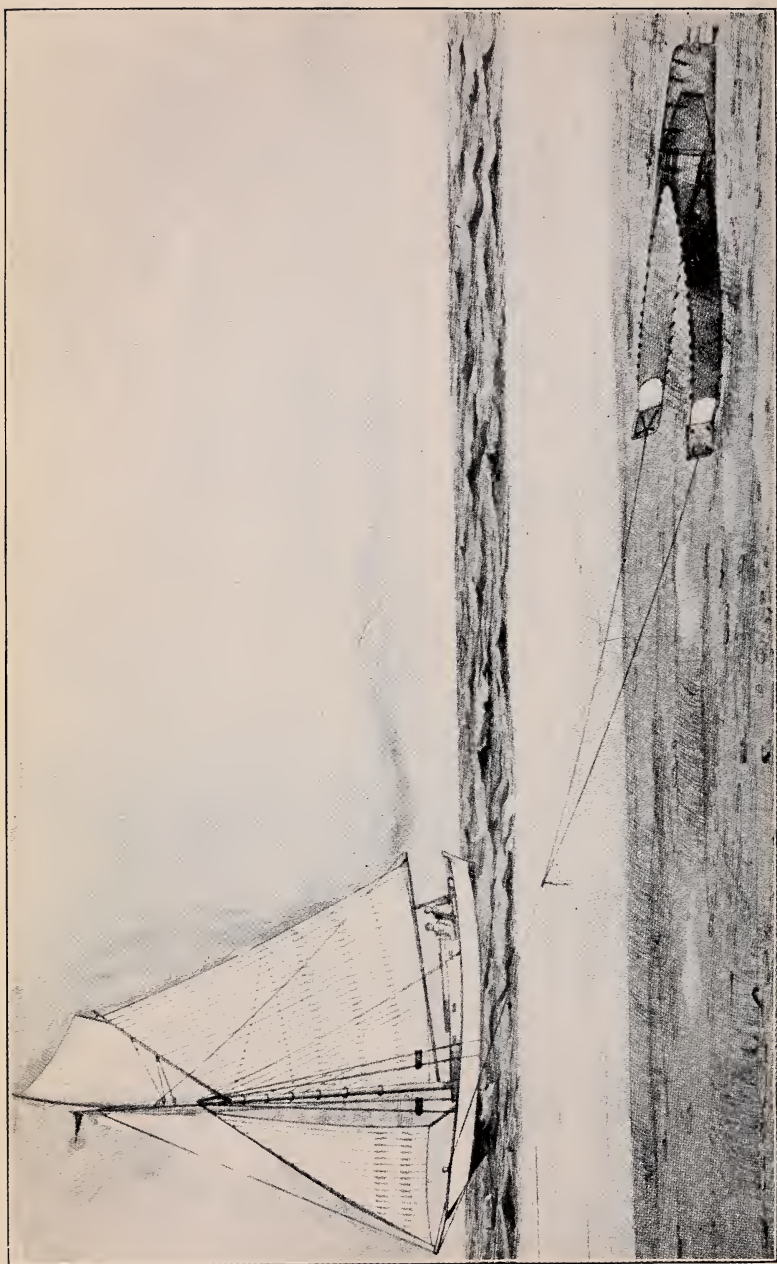
* Boston "Globe," July 24, 1904.

chairman. While the fishery at first and for years after was carried on in a very primitive manner, mostly in small boats, later in schooners whose rig was unsuitable to the requirements, it has been estimated that a yield approximating 70,000 barrels of flatfish has resulted. It is claimed that in 1897, ten years after the fishery began, the catch exceeded 6,000 barrels; and this, too, despite the fact that this particular method of fishing is prosecuted only in winter, — October to February.

Provincetown now has a fleet of 18 or 20 small fishing sloops, — some of them with auxiliary power, — ranging from 45 to 60 feet in length, which engage in the beam trawl flounder fishing in Barnstable Bay, generally just outside of Long Point and Wood End, for an average of about five or six months in the year. During this time their crews are said to earn an average of about \$300 per month. After the trawling season is over in the spring these sloops take on board a lot of mackerel gill nets and other equipments for drift net fishing. They then go to the southern fishing grounds, — usually from off the Delaware Capes to Block Island, — and engage in the mackerel drift net fishery until July. After the first to the middle of June, however, they frequently fish north of Cape Cod. During July and August they are generally moored in Provincetown harbor, and lie there unused until it is time to fit out for the trawl fishery.

Vessels of this class are better for trawling than schooners are, but of course all sailing vessels are at a disadvantage in this fishery when calms are prevalent.

Otter Trawling. — In our last report mention was made of the experiment with an otter trawl on board the oyster dredger “Cultivator” of Wellfleet. The trawl had been constructed, under the direction of the late chairman, for Capt. L. D. Baker, the owner of the dredger; and the hope was cherished that opportunity might occur after the close of the oyster season to give the apparatus a thorough test in the flounder fishery of Cape Cod Bay. The extreme severity of the winter of 1903–04, however, brought about conditions which precluded the possibility of further trials with the otter trawl, for the “Cultivator” was frozen in and rendered helpless. Besides,



A DANISH BOAT TOWING AN OTTER TRAWL. From Report on the Exposition, Bergen, Norway, 1898, by J. W. Collins.

the fishermen were not favorably impressed with this new-fangled form of fishing apparatus, the efficiency of which they distrusted.

Finally, in compliance with orders issued by Captain Baker, trials were made in October, 1904. Meantime, the weights on the otters had been somewhat reduced, so that the gear worked over the ground more easily than when the trawl was first tried in the summer of 1903.

Capt. Samuel H. Hopkins, who commands the "Cultivator," is authority for saying that, unfortunately, the trawl was first put out on foul ground; consequently, it was soon filled with the dead seaweed which littered the bottom. When brought alongside, the great bulk of sea grass made a heavy weight to get over the side of the launch, but the net was hoisted on board and emptied of its unwelcome burden. There were few fish in the trawl, for the seaweed-covered bottom was not good ground for the flounders. While the net was being taken on board and cleared, a skipper of one of the local beam trawlers went on board the "Cultivator," and promptly advised the use of a beam trawl, which, in his opinion, was vastly superior for flounder fishing to any other form of apparatus. He did not think the otter trawl would prove effective. Naturally, the crew, tired and disgusted with their ill luck and the labor of clearing the gear, were ready to listen to the condemnation of the otter trawl. But Captain Hopkins determined on one more trial at least before reaching conclusions. The otter trawl was, therefore, put out again on a subsequent day. This time it chanced to strike reasonably clean bottom, such as is commonly fished by the beam trawlers, some of whom were working in the vicinity.

The net was towed twice, about two hours or less each time. When it was hove up alongside it was seen to be well fished, — so full on one occasion that the men were in doubt of their ability to lift the bulk over the dredger's side. As a matter of fact, they were barely able to do this, although they had a tackle to hoist in the bag of fish, a stout rope having been first put around the net for the lower block of the tackle to hook into. But by a determined effort the bulk of fish was swung over the launch's side, the rope that held the "cod end" was

unloosed, and the flounders tumbled out in a mass on the deck of the "Cultivator." Captain Hopkins says they had four barrels of fish, which, with those taken in the otter trawl on the previous trial, made six barrels as the result of a half-day's fishing, or more than a beam trawler caught that day fishing over the same ground. It will, therefore, appear that the otter trawl caught as many fish in a half-day or less as the best of the beam trawlers took in all day. While this result seems remarkable, and doubtless will have to be repeated to convince fishermen that such a catch was not a matter of luck, it is in complete harmony with the experience of British fishermen, who have proved by many years' fishing that the otter trawl is vastly superior in effectiveness to the beam trawl. It is only reasonable that similar results may occur here if equal intelligence is applied; hence it may not be visionary to anticipate seeing the flounder fishery at Cape Cod carried on in the not distant future with power boats operating the otter trawl, while there may be a fleet of ocean-going steam trawlers working on our outer banks. We cannot remain indifferent to a form of fishing apparatus which has revolutionized the deep-sea market fisheries of Europe.

Captain Hopkins informs us that his oyster dredging will prevent him from soon using the otter trawl again, but he is fully convinced that it can be employed in the Cape Cod flounder fishery with great success.

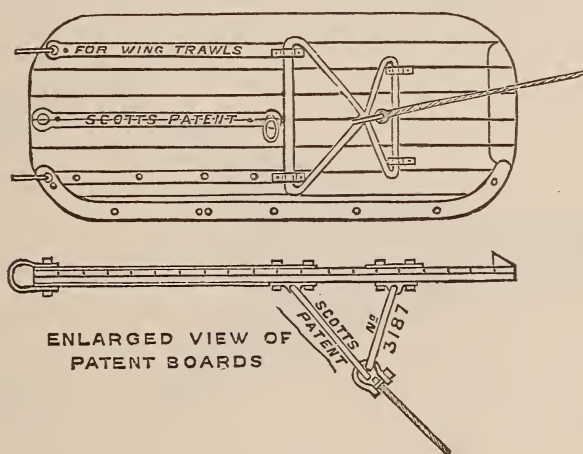
The otter trawl has proved to be a most important apparatus for developing the North Sea fisheries. Our late chairman, Capt. J. W. Collins, one of the eminent authorities on such matters, believed that the otter trawl was adapted to certain branches of our fishing industries. He recognized the advantages likely to redound to our fisheries through the use of the otter trawl. On account of the importance of the subject, and to answer the inquiries which have come since the supply of last year's report was exhausted, it seems best to reprint the description of the construction and use of the otter trawl, which was kindly furnished to our late chairman by Hon. O. T. Olsen of Grimsby, Eng.:—

This matter of properly managing an otter trawl is of such consequence that we venture to publish the instructions we have received,

and also illustrations of an otter trawl and of Scott's patent otters or trawl boards. The instructions have been slightly revised, and we hope they may prove useful and valuable to our fishermen.

In Grimsby two flexible steel wire warps are used on a steamer operating otter trawls, and two steam drums or winches — one for each warp — to heave them in. When rigging trawling gear, great care is required in determining the exact length of both warps.

Each warp is made up in lengths of 20, 25 or 30 fathoms, and these sections are shackled together, each end having an eye splice and thimble to receive a shackle. The shackles serve as marks to determine the length of the warp that has run out, — a very important matter, and possibly the most important in shooting a trawl, for the warps must be veered out evenly to avoid fouling the trawl; there-



fore, if it is found that a shackle on one warp has run out before the other, that warp must be checked until the hawsers are "levelled up."

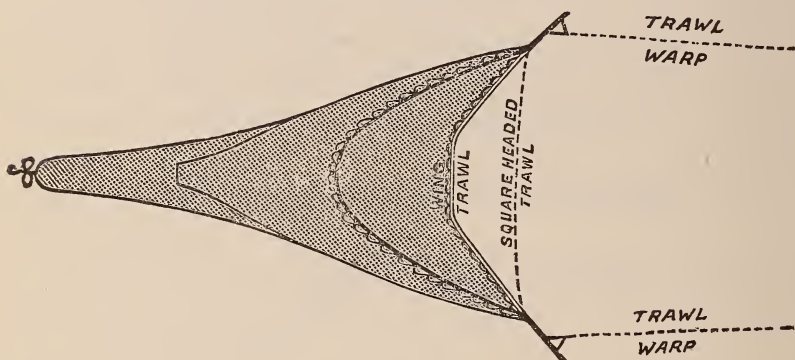
With these leading facts in mind, the act of shooting a trawl is as follows:—

With engines stopped and ship laid dead, proceed to pay away the trawl over the weather side, taking care not to pay away too smartly, but to allow it time to sink, as throwing it out too quickly is often the cause of a fouled net.

One of the best methods of doing this is to pay over the fore and after wings first, till you come to the quarters, — the sections of the body of the net next the wings, — then put over the cod end, the extreme end of the net bag or trawl followed by the belly and baitings, till the net comes tight to the bosom of the ground rope; then lift the ground rope on to the rail and drop it over the side, when, as a rule, your trawl will be found to flow out quite clear.

In the event of the trawl being new and light, you will find it an excellent plan to weigh the cod end with an old fire bar, or something else of no value, fastened to the cod line with a single part of twine, so that it will break adrift when on the bottom, and will not retard the towing of the net.

With the trawl away clear and the quarter ropes securely fastened, each man should take up his respective position, which in a Grimsby trawler is generally as follows: captain on the bridge; mate and No. 1 deck hand attend the winch; third hand at after derrick; No. 2 deck hand at fore derrick; trimmer amidship, ready for the messenger, which is a wire hawser that is long enough to reach from the winch to the stern of the vessel, around the after derrick or galleys, — also called a davit, — thence outside the rigging to the fore derrick. The messenger is passed over the after trawl warp and taken forward, where the stout hook at its end is put over the fore-



ward warp, down which it is allowed to slide. Meantime the winch is started and the messenger is hove in, bringing both warps together on the quarter, when a strong slip chain is passed around both warps and secured, while the messenger is unhooked.

Setting up taut on the warps, the dogs* should be unhooked, and, everything being in readiness, the order is given to lower away. This is done by lowering away the fore board about 8 or 10 fathoms, and then slacking down the after one well below the propeller. It is a good plan to mark the warps in this position, as it is very difficult to guess the lengths when lowering away at night.

There are several other ways in vogue, notably where the steamer is fitted up with a single-barrelled winch; but, as those are mostly out of date, it is not worth while going into details.

* A dog is an iron claw with two stout teeth that is shackled to an eye bolt in the deck and is used for slipping over a chain as a stopper.

Everything being ready, the engines are started full speed ahead, and as soon as the ship has sufficient headway the order is given to slack away. This is part of the work that requires care and judgment on the part of the men at the winch, for, if the warps are not run out evenly, or as near so as possible, then the error is sure to result in fouled gear.

The best and surest way is to watch for the marks or lengths of warps as they are running out, and check up the one which has run out fastest, so as to level them at each mark or length; they cannot then get very much out of line.

During the time the warps are running out, the man at the after part of the ship will have passed the hook end of the messenger out around the after side of the after derrick, then over the top of the after warp and into the hands of the trimmer, who will take it along the deck (always being very careful to keep the bight of it inboard) and hand it over to the man forward. The trimmer then goes aft abreast of the engine room skylight, and stands by for the word of command to throw the bight of the messenger over the rail and overboard, so that it will go clear of the ship and screw.

When sufficient warp has been run out, breaks are screwed down, and the order is given to hook the messenger over the fore warp and let go, when, by its own weight and the ship's headway, it runs along aft on the fore warp. The trimmer then flings the bight overboard, while the man aft hauls in the slack as much as possible and places it in the hawser roller aft; the trimmer, assisted by the deck hand No. 1, puts turns round the end of the winch barrel, and the mate proceeds to heave away on it. As the fore warp is being hove up aft, the hook of the messenger picks up the after warp also, thus bringing both warps together up to the after quarter.

Having hove the warps up within a foot of the roller, a patent slip hook or block is put around them, attached to a strong chain; the messenger is then slacked up and unhooked, and then the vessel proceeds to tow along. While the snatch block just referred to holds the two towing hawsers together at one side of the stern of a steamer, the strain of towing comes on two heavy swivel blocks, of which there is one hanging beneath the centre of the arch of each derrick.* Each of the steel-wire towing hawsers passes over the block, thence

* A derrick is a stout iron device, shaped like an inverted U; it is strongly bolted to the vessel's deck near the rail, but far enough from it for the otter board to easily go between it and the rail; it is commonly called a gallows by the fishermen, but is also spoken of as a davit. There are four of these derricks, two on each side, one being well aft on each quarter and one forward. They are high enough from the deck so that the warp running through the block at the top of a derrick will lift an otter board clear above the rail, so that the board can be readily swung in or out, as circumstances demand.

around or through a guide or fairleader to the drum of the steam winch, which heaves in or veers out the hawser, as circumstances demand.

In the management of a trawl the so-called quarter ropes play an important part. These are two ropes which are used to assist in getting in the net. Each of the ropes is bent to the footrope at the quarter of the net, and leads to its respective otter board, where it is made fast so that it will tow loosely. After the trawl has been hove up alongside of the vessel the quarter ropes are cast off from the boards and led to the winch, when they are hove in evenly until the bosom of the footrope is over the rail. This saves a lot of hard labor for the crew in getting the trawl on board; but the rest of the net must be gathered in by hand until the "cod end," where the fish are, is at the surface of the sea, when a strap is passed around it, and it is hove on board with the fish tackle. The lower end of the trawl is then unloosened and the fish fall on deck.

An Epidemic among Menhaden. — June 9, 1904, the late chairman and the biologist of this commission visited Rhode Island for the purpose of viewing the experiments on the propagation of lobsters, carried on by the commissioners of Rhode Island. The entire day was spent in studying the apparatus and results. A distinguished company was present, including the Governor of the State and other high officials, as well as those directly interested in the problem. At that time it was noted that a serious epidemic had occurred among the menhaden in Narragansett and Buzzards bays, and, inasmuch as it involved the fishing interests of Massachusetts, not only in Buzzards Bay, but also on the eastern shore of Narragansett Bay, it is deemed of interest to publish here the investigations upon that epidemic which were carried on by Prof. F. P. Gorham of Brown University. Professor Gorham has recently made the following report to the United States Bureau of Fisheries: —

In the latter part of May, 1904, the menhaden in Narragansett Bay were afflicted with a serious epidemic. The fishes died by the thousand and were washed ashore, where they became a nuisance as soon as they began to decay. The farmers of the neighborhood carried them away by the cartload to use as fertilizer, and in some towns the board of health found it necessary to remove them, so great a nuisance did they become. Other fishes were not affected by the epidemic. Occasionally a fish of another species was found among

the dead menhaden, but never more than are normally found along the shore.

The symptoms of the disease were peculiar. The affected menhaden would appear at the surface of the water, their mouths open, swimming in small circles, more or less on their sides, apparently struggling to sink in the water. Sometimes their equilibrium would be lost entirely, and they would spin around on their long axis as they shot through the water, running into any obstacles which they encountered. They would frequently leap from the water in their struggles; sooner or later they would die and sink to the bottom, only to rise again to the surface when the gases of decomposition formed, there to float with the tide or be cast up on the shore. They could be caught with a dip-net without any trouble when affected with the disease, while this is impossible with the normal fish.

No lesions could be found in the dead fish, either external or internal, save the bruises caused by their death struggles, and in some cases a slight protrusion of the eyeballs, which probably resulted from the bruises.

The fishermen ascribed the peculiar actions of the fish to a worm which they said was present in the brain of many of them. Investigation soon showed that this was not true. The "worm" which they supposed was the cause of the disease was the common parasite of the menhaden, the copepod *Lerneonema radiata*, which is always present in a considerable number of these fishes, and which causes no serious disturbance.

A bacteriological study of the diseased fishes showed that in the blood of many of them bacteria were present in considerable numbers; these were not present in the normal fishes. These bacteria were isolated in pure culture, and their characteristics studied. Inoculation experiments were made in normal menhaden and in other fishes. It was found that some of the cultures of bacteria when inoculated into normal menhaden would kill them quickly, but in no case were the exact symptoms of the disease reproduced, though it was always possible to recover the inoculated organism from the blood in large numbers.

Other fishes besides menhaden also succumbed to inoculation, although, as said before, other fishes are never affected by the disease naturally. The following fishes died when inoculated with very small amounts of the culture: squeteague, butterfish, sea robin. It required a large amount to kill the tautog; while even larger amounts would not kill the sea bass, scup, sand dab and puffer.

Of the several organisms found in the dying menhaden, it is probable that one is the cause of the epidemic. Further study of these

organisms must be made, however, before any one of them can be definitely implicated.

That the disease is caused by some infection spreading from one fish to another is evident from the fact that but one species is affected. If sewage or some other substance were contaminating the water, all fishes would be affected. Dead and dying fishes were found from the entrance of Narragansett Bay to the waters of the Providence and Seekonk rivers. They were as abundant down the bay in the clean waters as in the upper bay and rivers where contamination by sewage exists.

The disease did not show itself, as far as could be learned, along the shores of Long Island Sound, although schools of menhaden were abundant. The only other place where the disease is known to have occurred is in Buzzards Bay, in the vicinity of New Bedford and the Acushnet River. Here it was not so severe nor did it last so long as in Narragansett Bay. By the middle of July it had all disappeared from Buzzards Bay, while in Narragansett Bay it was more or less in evidence until August.

Menhaden were exceptionally abundant the past year; there were more schools and larger schools than for a number of years. It usually follows, when an animal increases over and above its normal numbers, that something occurs to reduce that number. It is probable that the epidemic in question was the result, primarily, of the great increase in the numbers of menhaden.

That this is not the first epidemic which has appeared among menhaden is evidenced by the following extract, from the report of the United States Fish Commission for 1877:—

Captain Pettingill tells me that great mortality often prevails among the menhaden at the mouth of the Merrimac River. In 1876 the dead fish were heaped upon the shore to a depth of two feet, and the municipal authorities of Newburyport expended a large sum of money in carting them away. The fish seem to die in great pain; they come first to the surface, then, after a severe flurry, die. They sink immediately to the bottom, but float at the surface after a day or two.

It is stated that the same mortality prevailed forty years ago, as now, among the menhaden in the Merrimac. They covered the shores, tainted the air, and were taken away by the farmers as dressing for land. It was noticed that the fish would come to the surface, spin around and around, and then turn over on their backs and die. These strange deaths are very probably caused by the presence of some internal parasite.

There can be no doubt that this is the same disease that has appeared again this past year.

It is hoped that opportunity will be offered during the coming sum-

mer to study the disease still further. It cannot yet be stated with certainty that the bacteria isolated are the real cause. Cultures of the germs have been preserved, and will be more carefully studied. Watch will be kept for a recurrence of the epidemic, in order that further observations may be made, some of the experiments repeated, and, if possible, the exact cause of the disease determined.

Shellfish or Mollusk Fisheries. — In previous reports attention has been invited to the fishery for the long-neck or common clam (*Mya arenaria*), and the wonderful results possible of attainment by cultivation have been presented. Experiments made by the United States Fish Commission a few years ago, and also by the Rhode Island Fish Commission, demonstrated conclusively that the cultivation of clams can be made profitable to an extent not easily equalled in any other direction.

It is not known that there is an opportunity to do as well with other species of shellfish that are commercially important, but it is doubtless practicable to improve nearly all of the mollusk fisheries in one way or another. The obstacle that confronts any attempt at improvement, by legislation or otherwise, is the dense ignorance of these industries, so far as official and reliable information is concerned, — an ignorance that is not creditable in a State so celebrated as this is for its comprehensive knowledge of all that pertains to its industrial life and welfare. It may seem a startling statement to make, but, so far as this commission is aware, there is not extant any modern publication of the State which contains anything that may be considered a comprehensive review of our mollusk fisheries. The bare statistics, without explanation, even granting that they may be correct, come far short of furnishing data which might convey a knowledge of the industries. Apparently the only study of the Massachusetts mollusk fisheries made in a half-century was that made in connection with the tenth census of the United States, the results of which were published about twenty years ago; they gave some idea of conditions in 1880, a quarter of a century ago. But what was then done was far from comprehensive; the notes then gathered and subsequently published by the United States Fish Commission lacked the completeness they should have had, and

nothing has since appeared that we know of that furnishes complete information.

Regrettable as this is, and contrary to the spirit of the age as it may appear, it is the natural outcome of conditions that date back to old colonial times, and are still continued, with slight, if any, modifications. In the early days it was natural that the shore fisheries should be, in whole or in part, placed under the supervision of the officers of towns bordering the sea, and that such officials should have jurisdiction over them, under the law, as to times and methods of fishing. At that period essentially the same condition obtained in many if not all of the coast-bordering States. Within the past thirty or thirty-five years, however, the control or supervision of mollusk fisheries and similar enterprises has become a care of State governments; commissions have been appointed for the special purpose of looking after them, and they have in consequence often received such intelligent supervision that deterioration has been checked and improvements have been inaugurated that led to great prosperity. Such changes were due largely, if not entirely, to comprehensive and properly directed studies of the different species of economic shellfish and the fisheries of which they were the objects. The results of such studies were published in annual reports and elsewhere, and furnished the information necessary for an intelligent consideration of conditions, and likewise supplied a basis for improvement. Indeed, beneficial change is scarcely practicable without a full knowledge of existent conditions.

The factor which has probably contributed more largely than any other to the indifference that has been shown toward the mollusk fisheries of Massachusetts, and the consequent dearth of information concerning them, is the system of town control, which is here still in vogue at the opening of the twentieth century. It follows, almost as a matter of course, that, to repeat an old saw, "Everybody's business is nobody's business;" and it cannot reasonably be expected that town officers will exhibit sufficient public spirit and technical knowledge combined to prepare and publish a comprehensive treatise on even one fishery for shellfish, not to speak of the consideration of a number of such industries.

There is another matter that deserves mention in this connection, and that is the fact that, with the present restriction upon publication, it would be useless to prepare reasonably full notes upon the mollusk fisheries for issuance in a public document, even if its appearance might do credit to the State, and might lead to conditions which would increase the yield of these shore industries hundreds of thousands of dollars annually. Whether there is a way out of these difficulties remains to be seen; but at least the hope may be cherished that something may be done to throw light upon the dark places alluded to, and to put this State in a position where it will not be necessary, as it has been, to confess absolute ignorance of industries pursued along her coast, which, in the aggregate, yield products worth tens of thousands of dollars and employ many men. Nor should it be necessary to confess the State's helplessness to do anything for those industries. They need her protecting care, for, with the great growth of population throughout the country, they should be developed and improved so that they can furnish a larger amount of valuable and nourishing food, and add more largely to the income of the State.

It is interesting to note in this connection that, according to the United States Bureau of Fisheries, Massachusetts produced, in 1902, 106,818 bushels of quahaugs or hard clams, worth (at prices paid the fishermen) \$131,139; 227,941 bushels of fresh soft clams, valued at \$157,247; 75,586 bushels of market oysters, worth \$120,252; 27,800 bushels of seed oysters, valued at \$13,430; 66,150 bushels of scallops, valued at \$89,982; and 2,000 bushels of cockles and winkles, worth \$5,600. This makes a total of 506,295 bushels of shellfish taken from the shores of this State in the year named, with an aggregate valuation of \$517,650. It will therefore be seen that the taking of shellfish, aside from the quantities of delicious food thus supplied, is an industry of sufficient proportions to entitle it to consideration.

Much more might be added, but perhaps sufficient has been said to draw public attention to existing conditions. Mention can be made, however, of a marked improvement this year in the direction of enforcement of the law prohibiting the taking

of shellfish from grounds subject to pollution. To the extent that this was done the public confidence in the healthfulness of shellfish taken in our waters is restored, and the trade in such products should be improved thereby. Unfortunately, however, the provisions of the law are such that its application is not easily practicable, consequently public confidence must necessarily be of much slower growth than otherwise might be the case, and there will be a consequent retardation of a healthy development of trade; for there are many who, although they may be fond of clams, quahaugs, scallops, etc., will prefer to go without them entirely if they have any suspicion that they came from regions infested by the germs and materials characteristic of sewage pollution.

Injury to the Shellfish Industry by Sewage Pollution. — The shellfish industry suffers a severe blow through the practical destruction of extensive areas, suitable for the production of shellfish, by the encroachment of sewage and other sources of pollution upon clam and quahaug beds. During the past year action has been taken as detailed below. The following was inserted in the New Bedford newspapers:—

The Commissioners on Fisheries and Game, acting in accordance with law, as embodied in sections 113 and 114, chapter 91 of the Revised Laws, call public attention to the action they have taken in reference to the prohibition of oyster, clam and quahaug fishing in certain areas in New Bedford harbor; and they also give notice that after the expiration of one week from the appearance of this notice it will be illegal for any person to take oysters, clams and quahaugs within the limits prescribed by the request of the State Board of Health, which limits have been defined and fixed in accordance with law.

Following is the order passed by the Board of Commissioners on Fisheries and Game:—

Whereas, The State Board of Health, acting under and by authority of the provisions of section 113 of chapter 91 of the Revised Laws of Massachusetts, has requested in writing this Board to prohibit, in accordance with the provisions of said section, the taking of any oysters, clams or quahaugs from the waters of New Bedford harbor, north of or inside of a line drawn from Fort Point in Fairhaven to a point on the easterly shore of Clark's Point, so called, one mile south of the most southerly sewer outlet in the city of New Bedford, or from the waters of Clark's Cove at any place

within three-quarters of a mile of the outlet of any sewer of the city of New Bedford discharging into Clark's Cove, until further notice ;

Voted, That, in accordance with the request of said State Board of Health and with the provisions of section 113 of chapter 91 of the Revised Laws of Massachusetts, the taking of any oysters, clams or quahaugs from the waters of New Bedford harbor, north of or inside of a line drawn from Fort Point in Fairhaven to a point on the easterly shore of Clark's Point, so called, one mile south of the most southerly sewer outlet in the city of New Bedford, or from the waters of Clark's Cove at any place within three-quarters of a mile of the outlet of any sewer of the city of New Bedford discharging into Clark's Cove, be and the same hereby is prohibited until further notice.

The immediate effect of the above notice, which was published in the New Bedford "Evening Standard" of Aug. 11, 1904, was a general falling off in the number of fishermen, but gradually the fishermen returned in considerable numbers. Learning of the condition, the deputies of this commission were ordered to check the taking of shellfish in this prescribed section. Aug. 29 and 31, 1904, twenty-six men were arrested for taking quahaugs within this area. They had in their possession an aggregate of nearly ten bushels, in quantities from two quarts to a bushel. Since that time the law has been very generally respected.

It is, of course, a serious economic condition, whereby an area so extensive as this is rendered worthless for the production of shellfish. Until the time comes, however, when it is for the advantage of the citizens and of the State to check the polluting influences and to dispose of sewage and manufacturing wastes in such a manner as to permit the areas in question to produce the food supply which they should, the matter will have to be handled as at present. With increased population the conditions in other parts of the shore may become similarly a menace to public health through the medium of infected shellfish, and necessitate the extension of these areas from which the taking of shellfish must be forbidden.

Lobster Culture and Lobster Fishing. — The details of what has been accomplished in breeding the lobster at the stations of the United States Fisheries Bureau on the coast of this State — Gloucester and Woods Hole — are given in the following letters from the superintendents of those stations : —

DEPARTMENT OF COMMERCE AND LABOR,
BUREAU OF FISHERIES, GLOUCESTER, MASS., Oct. 26, 1904.

Capt. J. W. COLLINS, *Chairman, Board of Commissioners on Fisheries and Game, Boston, Mass.*

SIR:— I submit herewith a brief report of the lobster-hatching operations at Gloucester, Mass., station, during the past season.

Our collection operations began early in April, and covered the principal fishing centres between Cape Ann and Boston, Mass. The natural conditions during the entire season were especially favorable for lobster fishing, and the catch about Cape Ann showed a substantial increase over previous springs during the past decade, and our egg-lobster collections also showed a corresponding increase.

Our collections within the State aggregated 2,012 egg lobsters, of which 752 were shipped to the Woods Hole station, owing to this station being crowded. The egg lobsters shipped to Woods Hole yielded 12,948,000 eggs, while those handled at this station, 1,260, yielded 22,310,000 eggs.

There were 32,050,000 lobster fry distributed from this station in Massachusetts waters, from Cape Ann to Boston harbor. Of the above fry, 20,971,000 were obtained from eggs collected within the State, the balance being hatched from eggs collected outside the State.

Collections were also made in Maine and New Hampshire waters, which aggregated 81,897,000 eggs, the bulk of the fry resulting from these being planted in the waters of the State whence they were received.

Very respectfully,

C. G. CORLISS,
Superintendent.

WOODS HOLE, MASS., Nov. 7, 1904.

Capt. J. W. COLLINS, *Chairman, Board of Commissioners on Fisheries and Game, Room 238, State House, Boston, Mass.*

SIR:— Herewith I submit a brief report of the lobster work done at this station during the past season.

Owing to the existing conditions, which could be traced to several causes, no active efforts were made to collect egg-bearing lobsters except from the fishermen in this immediate vicinity. Nearly all the eggs received at this station were from lobsters collected by the employees of Gloucester station, and shipped here. Of a total of 13,831,000 eggs received during the season, 883,000 only were from local territory. The eggs this season were of poorer quality than for several years, and the result in fry correspondingly small, 9,682,000 fry being hatched and planted in the waters of the State.

Respectfully,

E. F. LOCKE,
Superintendent.

Before entering upon a fuller discussion of the foregoing reports it may be said, in order to avoid mistakes on the part of the reader, that the collections made by Mr. Corliss, which he states were "between Cape Ann and Boston," really were made at those two points as well as between them. He informs us that egg-bearing lobsters were gathered at the various stations on Cape Ann, including Rockport, Lane's Cove, etc., also at Boston, which is the chief market for lobsters in the United States, and imports large quantities of these crustaceans from Nova Scotia. It was, therefore, probably the point where by far the largest number of egg-bearing lobsters were obtained. The bulk of the Boston lobsters came from the British Provinces, and, while they added to the possibilities of artificial reproduction of this species, and may fairly be designated as "lobsters collected in Massachusetts," it is an indisputable fact that only a trifling percentage of them at most came from the waters of this State.

As will be noticed, the collection from Woods Hole was nearly an utter failure; but a combination of happy circumstances — good weather, a larger supply of foreign-caught egg-bearing lobsters than usual, and, possibly, added experience in the work of collecting — gave better results in the obtaining of lobster eggs this year along the north shore than for some time past. To that extent there is reason for profound gratification. While a repetition of such success can scarcely be expected every year, and while there is small reason to expect any egg-bearing lobsters from Maine next year, because of the establishment of a hatchery on the coast of that State, still, it is important that every effort should be made to advance artificial propagation, and courageously hope that added effort may produce results equal to those secured in 1904.

The provision made by this State for the collection of egg-bearing lobsters may prove an important factor in the work next year, and may add materially to what the United States Bureau of Fisheries may be able to accomplish. Co-operation along this line should result in satisfactory attainments, if the hearty support of the fishermen is secured; for the addition to the collecting boats of a well-equipped State launch, like the "Egret," should be an important factor in securing the results hoped for.

It may be mentioned here that, although the season was nearing a close when the "Egret" was ready for service, after being fitted with a well and having other changes made, she collected 970 egg-bearing lobsters, 504 of which were delivered to the Woods Hole station of the United States Bureau of Fisheries, payment for the same being made to the State by the Bureau. Of course the eggs on these lobsters were green, and will not be ready to hatch until next summer; but the experiment of keeping them over winter will be made. If it is feasible to thus keep them, the number that live will be that many added to those secured next spring, and the eggs they yield will be that many saved from destruction; while the adult lobsters will be returned to the water whence they were taken, instead of being sent to market, as would have been the case had we not secured them. They will at least have one more chance to reproduce their kind. It is likewise expected that we shall be able to get from the station at Woods Hole any fry hatched from the lobsters we send there; and, if so, the purpose of this commission is to do our utmost to return to the waters from which the female lobsters were taken a proper proportion of fry. This will, of course, involve much extra work; but it is only just that the fishermen of each locality should be treated with absolute fairness in the matter of stocking the coast waters. It will be scarcely fair to take egg-bearing lobsters from one locality and put them and their progeny into the waters of another section. It is a fear that this will be done which has caused some of the fishermen to refuse to sell egg-bearing lobsters either to the federal authorities or to the State. They complain that lobsters sold by them heretofore for purposes of artificial propagation have been put into other waters, and that they have not received the fry which should have been planted on their fishing grounds.

We believe an honest effort has been made to deal justly with the fishermen; but, however that may be, the fact remains that some, at least, are not satisfied, and claim unfair treatment as a reason why they should not co-operate in any effort to promote artificial propagation. Were it certain that every egg-bearing lobster would be returned to the sea, so that it could naturally propagate its kind, no real harm would result

from this determination; but serious harm is liable to come from the brushing away of the eggs by some of the fishermen, who prefer to sell all the lobsters they catch and get the money they will bring. Some of these fishermen have little regard for law and less for any possible future benefit to the fishery as a result of present self-denial.

It is not, perhaps, surprising that many theories are held by the fishermen regarding the decadence of the lobster. Strange as it may appear, there are those who stoutly assert that there has been no decadence in the abundance of the lobster; and that, too, in the face of all the evidence to the contrary,—evidence so convincing and so overwhelming that it is folly to gainsay it. One fisherman correspondent thinks that, because the fishermen in his locality are “still getting a fair living out of the business . . . shows the lobsters haven’t diminished any in the last twenty-five years on Cape Ann,”—a reasoning so glaringly inconsistent and misleading as to carry its own refutation. But that is not the worst, for the same individual gravely writes to the commission as follows: “I have fished outside the Salvages and Lodoner and Milk Island Ridge for the last eleven years, and find a great many lobsters *get frost bitten in winter.*” The assertion that the sea off the New England coast, and especially off Cape Ann, is sufficiently chilled in winter to cause lobsters to be frost bitten at depths ranging from 15 to 30 fathoms would certainly be startling, if the statement could be relied on. A temperature that would cause a lobster to be frost bitten at such depths would cover the surface of the sea with ice so heavy that no vessel except an ice breaker could sail through it.

Another, who states that whereas 12,000 lobsters were not considered a large catch at Chatham fifteen years ago, but 2,000 would be above the average season’s take now, attributes the decline to the destruction of the young lobsters by an enemy which he believes has recently entered the field in that locality. Writing of this decadence, he says: “The cause is the great enemy of the young lobster, the English turbot. . . . Last season I found as high as 41 young lobsters in one flounder. Fifteen years ago the flounder was unknown here.”

There can be no doubt of the honesty of this statement, but

this does not prevent it from being erroneous and misleading. In the first place, the English turbot does not occur in our waters, and never did; it is the common flounder or plaice or dab which has been found with young lobsters in its stomach. There are several species that occur in the waters off Chatham, and doubtless have been there in abundance always. Our late chairman caught quantities of them there on several occasions about thirty years ago.

It is well known that young lobsters are preyed upon by various species of fish, including those of the flounder family; but it is highly probable that, during its free-swimming stage, when it is near the surface of the sea, it is eaten most extensively by surface fishes, such as the mackerel, bluefish, squeeteague, etc., although other free-swimming species, like the cod and pollock, are doubtless more destructive than the flounder. The latter, as is well known, is strictly what is known as a bottom-feeding genus, and does not often seek food at or near the surface of the sea. Nevertheless, the flat fishes are known to pursue their prey to the surface when occasion demands it; and there is strong reason to believe that the flounder is an active and destructive foe of the young lobster, and one that has always been such. It is, therefore, not the natural enemies of the young crustaceans that have caused the marked decadence of adult lobsters at Chatham (or elsewhere), but the thoughtless and law-defying actions of the fishermen, who, according to the correspondent quoted, unhesitatingly tear off the eggs from the swimmerets of gravid female lobsters and then ship them away to market, fully content with trifling present gains, but utterly regardless of the future. But why should they care, when they are convinced that the gradual disappearance of the lobster from their fishing grounds is not due to their own improvident acts, the result of which was foretold to them years ago, but to the flounder!

It is unnecessary to follow this farther. The fact is that, except in rare cases, there is complaint of the scarcity of the lobster, — growing and continuous scarcity; but the increase in price enables the fishermen to eke out a livelihood on a catch that has been growing less and less as the years went

by. The increase in the collection of egg-bearing lobsters and reported fair catches in one or two localities are the first rays of light that have been shed in many years on an otherwise dark picture of industrial decay. Whether they justify a confident hope of "better days" remains to be seen; but at any rate we can hope, even if our wishes and hopes are somewhat overshadowed by misgivings.

As will be seen, the letters of Messrs. Corliss and Locke show clearly the number of fry hatched from eggs obtained from lobsters collected on the coast of this State, and they also show the number of fry hatched from eggs collected in other States, that were planted off our shores. Reference is made to the tabulations in the chapter entitled "Work of the United States Fisheries Bureau" for information as to the points where the fry were liberated in the sea.

The following table will show the results of the lobster-hatching work, so far as it applies to Massachusetts, during the past four years, ending June 30, 1904:—

Table showing Comparative Statistics of Lobster Culture by the United States Bureau of Fisheries at the Massachusetts Coast Stations in 1901-04.

	1901.	1902.	1903.	1904.
Number of egg lobsters,	2,045	2,361	1,323	2,063
Eggs obtained, . . .	26,679,000	33,241,000	22,983,000	36,141,000
Fry hatched, . . .	24,140,000	30,352,000	21,127,000	30,653,000

If the statistics of the lobster fishery, gathered by this commission, gave any encouragement of an increase of abundance which would seem to substantiate the indications in the foregoing table, there would be cause for satisfaction. Unfortunately, however, the contrary is true; for the figures show conclusively the same old dreary decadence of supply that has characterized the lobster fishery for many years, and which has gone on with the regularity and irresistible force of the movements of an ice floe. If this continues (and there is no present indication of anything else), the outcome—the commercial

extinction of the lobster — is as sure to result as day is to follow night.

There has been an increase of pots per man, but a falling off in the catch per pot from 33 in 1903 to $28\frac{1}{2}$ in 1904, or a decadence of about 14 per cent. In thirteen years there has been a decrease of more than 66 per cent. in the catch of lobsters per pot! Is it necessary to say more?

The Launch "Egret." — The third section of chapter 408, Acts of 1904, which was approved and became a law June 3, 1904, made provision for the procurement of a launch for collecting egg-bearing lobsters, as follows: —

For purchasing, equipping and maintaining a suitable boat to be used by the said commissioners in enforcing the provisions of this act, a sum not exceeding four thousand dollars may be expended.

In view of the fact that the collection of egg-bearing lobsters involves cruising along the entire shores of the State, including the long stretch of harborless and dangerous coast on the east side of Cape Cod, between Provincetown and Chatham; and that the delivery of such lobsters to the Woods Hole station of the United States Fisheries Bureau, for the purpose of propagation, would likewise necessitate frequent passages from the north shore of Massachusetts Bay to and around Cape Cod, as well as across Nantucket shoals to Woods Hole, — it was evident that the launch acquired should be large enough to make such a trip in ordinary weather without too great risk; that she should be sufficiently powerful and swift to make the runs in a short time, so as to minimize the danger arising from prolonged passage; that she should be strong and tight, built on a superior design, to ensure the maximum of seaworthiness; that she should be equipped with a well, wherein the lobsters could be kept alive; and also that she should have accommodations for her crew to cook, eat and sleep on board, in order that the living expenses of the men could be kept as low as practicable.

It was quickly seen that such a "boat" could not be built for the sum appropriated; it would unquestionably cost considerably in excess of \$4,000, or else it would have been necessary to construct a launch much smaller than was needed.

Besides this, it would have been practically impossible to design a launch, get out all her plans and complete her construction, in time for her to be used this year in collecting lobsters.

Under these circumstances, it was promptly determined to purchase a launch already built, if one could be found which had the chief requisites, and could be purchased at a reasonable price. Even if changes had to be made, it was deemed possible to make any necessary changes to fit her for her work and still keep safely within the appropriation, while there was a probability of getting the boat ready in time to do considerable service in the special line for which she was required.

We were fortunate in having learned in advance of a launch that was for sale, admirably suited to our purpose in many ways. She was built by the Murray & Tregurtha Company of South Boston, in 1903; had been used only a few weeks, — barely long enough to limber up her engines; and in every particular was as good as new, with the exception that she required a light coat of paint, a little varnish and the overhauling of the tender. Her construction was up to the highest standard; she was equipped with a new design four-cylinder Murray & Tregurtha engine, rated at 20 horse-power, but developing 26.

The launch had originally cost nearly \$4,000, with her equipment; we purchased her for \$2,750. After the purchase was concluded, the necessary alterations were begun in conformity with plans of the late chairman, authorized by the Board.

The "Egret" has an extreme length of 42 feet, and is 40 feet long on top; she is 8 feet 6 inches beam, and 4 feet 9 inches moulded depth. The total length of the cabin is 19 feet 6 inches; it is 7 feet 6 inches wide. The forward cabin is 7 feet 6 inches long. The cockpit is 9 feet 9 inches long; after rail of cockpit to extreme stern on top, 2 feet 6 inches.

The "Egret" has a speed of about 12 miles an hour, or a little better than 10 knots. She is one of the most powerful and swiftest cruising launches of her size on the coast of this State, for she easily maintains a 10-knot speed under any ordinary circumstances. The seaworthiness of the launch was

severely tested in going around Monomoy Point in a strong south-west wind. That she passed safely through such an experience is sufficient evidence of her strength, power and sea-going qualities. The incident also emphatically demonstrates how unwise it would be to undertake the work the "Egret" has to do in a launch less qualified for it in size, or any other particular.

The changes made in the "Egret," including equipment for cooking, changes to and cleaning of engine, ballast, naphtha for trial trip, etc., cost \$850.60. This brings her cost, ready for service, to \$3,600.60, or about \$800 less than a new launch of the same type and size could be built for, if she was equipped in a similar manner.

The cost of equipment and changes, as given above, does not include charts of the Massachusetts coast, the cost of which was about \$10 or less.

Reasonable satisfaction is felt by the commission that it has been able to secure such an excellent boat for such an outlay.

Work of the "Egret."—The "Egret" was completed and launched near the close of September; but owing to the extensive alterations in her, and especially the building of a well forward, material change had been made in her displacement and in her trim. It was therefore necessary to give her preliminary trials before sending her along the coast to collect egg-bearing lobsters, for it is evident that she might meet with serious disaster if not in good working trim.

The first trial trip was a short run down Boston harbor and return. This run developed the fact that the launch was considerably too much by the head; consequently, she did not steer well, and required too much space to turn in. It was also seen that a bell by which the engineer could be signalled was an imperative necessity. A few minor alterations were required.

After the necessary changes were made, such as putting some ballast under the cockpit floor, installing the bell, etc., the late chairman ran down as far as Marblehead on a final trial trip, which proved that the launch was in shape for the duties she had to perform. Immediately after, she was put into commission; and, beginning at Cape Ann, cruised along the coast

from station to station, where egg-bearing lobsters could be secured, from Gloucester to Monomoy Point, Chatham.

The "Egret" carried one cargo of lobsters around Cape Cod to Woods Hole, where she delivered them to the superintendent of the station of the United States Fisheries Bureau. Subsequently two consignments of egg-bearing lobsters were shipped to Woods Hole from Boston by rail, since it seemed better to send them by rail, during the inclement and uncertain weather of late autumn, than to attempt to transport them on the launch, especially in consideration of the delays which were practically certain to be caused by heavy winds and storms.

We had an arrangement with the Bureau of Fisheries to deliver 500 egg-bearing lobsters at the Woods Hole station; we delivered a total of 504, as already has been stated; 2 died in transportation, leaving 502 received alive. The State was reimbursed for them, the money actually paid us for the lobsters amounting to a total of \$125.50. This sum was turned over to the Treasurer and Receiver-General.

If the experiment of keeping the lobsters over winter at Woods Hole succeeds, future autumns may bring larger opportunities for us to aid the work being done by federal authority on the shores of this State in the artificial propagation of the lobster. Success in wintering lobsters has been met with in Maine, and the attempt to winter them at Woods Hole will be watched with interest.

In addition to those that were sent to Woods Hole, the "Egret" collected 439 egg-bearing lobsters that were liberated on the fishing grounds where they were taken. Usually they were carried one to three miles off shore from where the pots were set, so that there would be less chance of their capture the second time this year. In every instance a round hole was punched through the middle flipper of the tail of a lobster before it was liberated, so that its purchase the second time could be easily detected. This hole is so placed that even after a lobster sheds its shell its mark can be detected. None were obtained the second time in the fall of 1904, but it is reasonable to suppose some of the marked crustaceans will be in evidence in the spring and early summer of 1905.

We paid a total of \$279.80 for lobsters, including \$6.35 railroad charges on those sent to Woods Hole. Deducting the \$125.50 returned to the State by the Bureau of Fisheries, the actual net outlay for lobsters was \$154.30. Of course this does not cover the expenditure incident to running the launch, the salaries and living expenses of the crew, gasoline for the engines, etc.

It is pertinent to explain that men fully qualified to fill the positions of master and engineer on the "Egret" had to be sought for, and could be secured only if employment the year round was assured them. To place the launch in the hands of inexperienced or inefficient persons would be to invite disaster; the commission never contemplated taking any chance like that.

The price paid for lobsters, with the exception of a few very large ones obtained at Chatham, was 25 cents each; 25 cents additional was paid for the largest ones. The price was fixed after consultation with some of the leading lobster dealers in Boston, and was approximately 25 per cent. more than they estimated the market price of the average-sized lobster would be.

As a result of experience, however, we are satisfied that a better plan than to fix one price per lobster is to weigh the lobsters when taken from the fishermen, and pay for them, in accordance with their weight, a reasonable percentage above the market price. It is not always easy to weigh lobsters when the boats are bouncing about and pounding each other in a seaway, and when time is limited and delay dangerous. If the system is feasible, weighing is the surest way of securing actual justice to the fishermen. Lobsters on some parts of the coast are two or three times larger than they are in other localities; consequently, they are more valuable either in the market (where they are practically certain to go, if we don't buy them) or as egg producers.

The effort to collect egg-bearing lobsters was continued until near the close of November, — the "Egret" was hauled out and put into winter quarters November 25, — at which time all the lobsters that had been obtained and held in storage for us had been collected and disposed of. The permits issued



THE LAUNCH "EGRET" AT FULL SPEED.

granted the privilege to collect egg-bearing lobsters until November 1 north of Cape Cod, but it is evident all could not be collected by the "Egret" at the same moment. Inclement weather, and especially several hard gales, delayed the work of picking up the lobsters from Cape Ann to the fishing stations south of Boston on the so-called south shore; thus it took about three weeks to visit all the places where we expected egg-bearing lobsters were held for us. By that time the fishery was practically over for the year. The weather was rough or menacing most of the time. The temperature was occasionally sufficiently low to cause anxiety lest the vapor freeze, and render the gasoline engine useless.

The crew of the "Egret" consisted of only two men; but, while they have successfully performed the duty devolving upon them, it is evident that an additional man is needed to run the launch. When making a passage, the boat should have the full and exclusive attention of a man at the wheel and another at the engine. Therefore, with only two on board, there is no opportunity to either cook or eat while the launch is under way. It is clear that either can be attempted only at a risk; the only alternative is to take a hasty bite of ship biscuit and wash it down with cold water,—a most unsatisfactory meal for men engaged in hard work, covering long hours of close application and intense alertness. A saving that compels undue hardship or risks which are avoidable is not economy.

The illustration opposite this page shows the "Egret" in ordinary cruising trim, running down Boston harbor at full speed.

Summary of Lobster Work done by the "Egret."

Marked and liberated at sea,	439
Died while in our possession,	22
Lobsters whose eggs were destroyed by accident while in our possession,	5
Forwarded to Woods Hole,	504
<hr/>	
Whole number of egg-bearing lobsters collected,	970
Number less than 10½ inches,	52

We are making elsewhere recommendations for a "lobster meat" bill (see page 150), which prohibits the sale of uncanned

lobster meat without the shell. Further, the bill requiring that lobster fishermen be required to secure from this Board a permit, which could be revoked at any time in case the holder was caught violating any law for the protection of lobsters, is also in the line of advanced and efficient legislation, and makes towards uniform legislation throughout the lobster-producing regions. These measures are moderate and salutary, but are opposed by fishermen, who appear not to have the faculty of seeing beyond the immediate present. When our late chairman, Captain Collins, was asked before the committee why he did not recommend a close season, he replied that he was desirous of trying other measures before inflicting such a hardship upon the men dependent on lobster catching for a living.

Deep-sea Fisheries.

Importance. — The commercial importance of the sea fisheries of this State is shown by the following figures, extracted from a recently issued bulletin of the United States Bureau of Fisheries, supplying statistics of the New England fisheries for 1902. It is fair to state, however, that the statements made, statistical or otherwise, so far as they relate to values of fishery products, are based on prices paid the fishermen, — often for undressed fish taken from nets, or on lines, and brought in by boats the same day; and they purposely fail to convey anything like an adequate idea of the value of the prepared product as it goes to the consumer, whether it passes through operations which may justify its designation as a manufactured article, or simply receives the care and attention which must be given to fresh fish to insure their proper fitness for food when they reach their destination, — the consumer. Speaking, then, in general terms, it is safe to estimate that the value of sea products, especially those used for food, are enhanced fully an average of 100 per cent. in the course of preparation for shipment. In order, therefore, to get at the correct value of the fisheries products of this State, it is entirely conservative, in our judgment, to double the figures given. So far, however, as the statistics relate to other matters, no such allowance need be made.

The authority cited shows that, in 1902, Massachusetts had

employed in its fisheries 14,300 persons, 594 vessels, with a total tonnage of 31,965 tons,* and a value, including outfits, of \$3,903,774; 11 vessels of 405 tons with outfits, and worth \$21,285, transporting fishery products (chiefly or wholly lobsters); 2,688 boats, valued at \$213,963; 253 seines, 9,071 gill nets, 170 pound nets, trap nets and weirs, 18 fyke nets, 155 dip nets, 65 beam trawls, lines valued at \$182,879, 994 eel pots and 26,376 lobster pots.† These, together with dredges, harpoons and other forms of apparatus, had an aggregate valuation of \$602,918. Including shore property, such as fish houses, etc., and cash capital required to conduct the business, the capital invested in the fisheries of Massachusetts in 1902 was \$10,811,594. This more than equalled the investments of all the other New England States combined, since their total capital in the fisheries was \$9,157,437. The products of the Massachusetts fisheries aggregated 230,645,950 pounds, with a value of \$6,482,427. If we double this amount, to arrive at an approximate value of the products when they go out from the wholesale dealers, we find a total of nearly \$13,000,000 as the amount annually gathered from the sea by our fishermen. The position held by this State in the yield of the fisheries is shown by the fact that the total value of fish products of Maine, New Hampshire, Rhode Island and Connecticut, as given by the Bureau of Fisheries, was \$5,797,974 in 1902, or nearly three-quarters of a million dollars less than the products of this Commonwealth were estimated to be worth.

The local importance of the vessel fisheries of Boston and Gloucester, the two largest fishing ports of the State, is shown in the figures given below, these being extracted from monthly bulletins issued by the United States Bureau of Fisheries. These do not, of course, convey a comprehensive and exact idea of the fisheries or fish trade of either port, for the reason that they do not include the boat fisheries. Beside this, it

* The presumption is that net tons are meant in the table issued by the Bureau, but such is not stated. If so, then consideration should be given to recent changes in the tonnage laws, whereby fishing vessels measure much less than formerly. By the standards in vogue a few years ago the same fleet of fishing craft now owned in this State would exceed 40,000 tons in the aggregate.

† The number reported to the Fish and Game Commission under oath was 20,058

is only just to say that large quantities of fish are landed at Boston from vessels belonging in other ports, including Gloucester, these being practically all fresh products. Nevertheless, the statements made are interesting and valuable. If we double the values, we will be able to arrive at a fairly close approximation of the worth of the fish brought in by the vessels, even if it is acknowledged that such an estimate makes no account of secondary products, such as tongues, sounds, livers, fish skins, etc.

During the year ending Oct. 30, 1904, the fish landed from American vessels at Gloucester and Boston aggregated 127,094,681 pounds of fresh and 39,248,360 pounds of salt products, with a combined value of \$4,266,492. Of these, Gloucester received 45,087,665 pounds of fresh fish, valued at \$797,141, and 38,173,360 pounds of salt fish, worth \$1,404,237; while Boston had 82,007,016 pounds of fresh fish, value \$2,035,017, and 1,075,000 pounds of salt fish, worth \$30,097.

The figures show conclusively that Gloucester is still heavily engaged in the salt fish industry, in which it always has been pre-eminent. Therefore, while it remains the great fishing port of the country, and sends to sea the largest fishing fleet that floats in the open ocean from a single port under the American flag, and while many of its finest vessels engage in the market fishery at least a part of the year, Boston, with its wonderful steamer and railroad facilities, remained the leading market of the State and of the country for fresh sea fish. This trade, which has already reached large proportions, must necessarily develop until the fish market of Boston is to America what Billingsgate is to Great Britain.

Disasters. — Although the fisheries have not been exempt from disaster, — losses of life and property that would appal those less accustomed to the dread havoc wrought from time to time, — and notwithstanding there has been suffering and death incident to fishing and loss of fine vessels by stranding, the unique fact stands out in bold relief that for the first time in many years not a single Gloucester fishing vessel, up to the date of this report, has foundered at sea, going down with all hands. This may justly be ascribed to the improvement in fishing vessels that has taken place in less than eighteen years.

Although our late chairman scarcely dared to hope that he would live to see his hopes realized, and with a full appreciation of the danger he incurred of being considered an unjustifiable agitator or crank, he nevertheless ventured to write the following in 1882, when urging changes in the design and construction of our deep-sea fishing vessels :—

Every fisherman who goes forth to brave the perils of the deep, whose success and life itself depends upon the merit of his vessel, should be well informed in regard to which is the safest model and the best rig ; every woman, patiently and hopefully watching for the return from sea of those she loves, should at least have the consolation of knowing that those she waits for have sailed in the *very best* vessel that human skill can devise ; every merchant who sends his fleet to sea should feel that everything has been done which can be done to relieve him of the enormous burden of insurance, which for years has so handicapped the Gloucester fisheries. If what I have written has any influence in bringing about a result so much to be wished for, then I shall be amply repaid for my labor.

This year has seemingly brought what then could only be seen by faith. For, despite the fact that the conditions faced were never more severe, the vessels have passed scathless through the wildest storms, so long as they had sea room, and proudly defied the elements. Instead of widowed women and fatherless children, as a result of schooners foundering at sea in storms, not a single casualty of that nature has been reported, and the loss of life in consequence is reduced to a minimum. Then, too, the vessels are better fitted for their work than ever before, as is evidenced by their increased earnings, even in a so-called “ bad year ; ” for the maximum stocks earned in the leading fisheries have been several times greater than they were thirty years ago, notwithstanding the scarcity of cod, mackerel and other species which are chiefly relied upon for financial results.

But, while much benefit has resulted from the wide adoption of properly designed vessels, the fact remains that the fisheries have not been exempt from loss of life, sometimes under circumstances of such a character that a bare statement of facts would read like a chapter extracted from the creation of a novelist's brain when indulging in the wildest forms of fancy. Much

property has likewise been lost, chiefly because of vessels stranding on outlying reefs, ledges or headlands, when the fishermen were running in thick fogs and snows. It is not practicable here, however, to do more than mention such disasters in the briefest manner, however much the conditions surrounding them tempt the pen to give them more extended mention. There have been numerous instances of rescue of men and vessels, the details of which are always interesting and are sometimes thrilling, but such have to be omitted.

The Cape Ann "News" of Oct. 29, 1904, reviewing the losses in the fisheries for the year ending with the close of that month, said: "The number of men who have been sacrificed in this hazardous but honorable calling has been the smallest of any year since 1865, for it was but 20, who left 3 widows and 9 children. . . ." Of these, 2 died on board their vessels while in port and 1 was drowned in dock; consequently, it will be seen that only 17 men were lost while actually engaged in fishing. Inasmuch as 1 of those who died in port was married, it therefore appears that only 2 women were widowed as a result of the dangers of fishing.

Of the men who met death at sea, part were washed overboard in gales and drowned, and some were lost while out in boats, attending trawls.

Up to the close of October, according to the "News," Gloucester had lost "11 vessels, with a gross tonnage of 1,191.03 and of net 719.69" tons. Four of these vessels were employed in the winter market fishery (3 of them were classified as "shore fishermen" and the other "a winter haddock"), 1 was engaged in the Grand Bank halibut fishery, 2 were mackerel fishing on the southern grounds (1 of these was run down by steamship "Deutschland"), and 4 were employed in the Newfoundland herring trade, which has recently grown to be exceedingly dangerous. One of the latter was the steamer "Alice M. Jacobs," which was stranded on the Newfoundland coast while making a passage. Three of these vessels were small, and of comparatively slight value, one being only 5 tons, 1 between 11 and 12 tons and 1 of 13 tons. All the others were fine vessels, among the largest and best built for the fisheries.

The account given by the "News" did not include the fishing schooner "Patriot" of Gloucester, which, according to the Boston "Herald" of July 4, 1904, went ashore at high tide on the Shovel Shoal late in the afternoon of July 2, and became "a total wreck, having been pounded so heavily by the breakers during the night that she will never be fit for service. . . . None of them [the crew] saved anything except clothing worn. . . . The wreckers discovered . . . a large hole in the bottom of the 'Patriot.' . . ." We are not informed that this schooner was subsequently saved.

Meantime, several other vessels engaged in the fisheries from Massachusetts ports were reported lost, but fortunately without loss of life except in one instance. The whaling schooner "Carrie D. Knowles" of Provincetown sailed from home January 27, and on May 8, 1904, the Boston "Post" declared that: "The Knowles left port intending to go straight to Dominica, where she was to ship what more men she needed for whaling." No news had come of her, — she was reckoned with the missing; and the "Post" published the statement that hope had "utterly gone out of the breasts of those who are accustomed not to relinquish it all until there is absolute surety that there shall be no late returning." It was reported that the "Knowles" had a crew of 15 men when she sailed from Provincetown.

The whaling bark "President" was lost by stranding on the west coast of Africa, but there was no loss of life.

The fishing schooner "Maggie Sullivan" was reported as having been stranded and lost on the west coast of Nova Scotia.

Many fishing vessels have been stranded and subsequently saved, and there have been numerous hair-breadth escapes of fishermen from imminent death. In one case the crew of a schooner, stranded on Sable Island, rowed more than a hundred miles to reach the mainland of Nova Scotia, and thus to escape from their enforced imprisonment on a sand bar in mid ocean. Half-frozen fishermen rescued from boats surrounded by ice floes and being driven to sea and to certain death; power-driven dories rendered helpless by gasoline freezing in tanks, thus exposing fishermen to almost certain destruction; men

reaching ports in small boats in the midst of wild flurries of snow; others astray for eleven days without food or water, exposed to the perils of the open ocean in a small open dory; others on an iceberg that rolled over; one with his hand blown off while firing a signal for men out in a fog; and others still who were exposed to the innumerable hardships and dangers incident to fishing, — were some of the many happenings that have come to our notice, but which, fortunately, were not fatal.

One particularly sad incident was that where two men, failing to find their schooner in the bitter winter weather of the early year, actually froze to death in their boat. One was washed out of his dory on Georges Bank and drowned.

Subordination, etc. — The unhappy results of insubordination of men on fishing vessels, which was such a deplorable feature of the fisheries of 1903, seem not to have been repeated this year. The most careful inquiry develops the fact that little difficulty has been experienced in getting crews or in maintaining reasonable discipline — fishermen's discipline — on board the vessels. In only one instance has there been trouble on a Banker. A part of her crew left her while she was in a Nova Scotia port on her second trip; in consequence, the vessel was compelled to return home and enter another branch of fishery.

It is true that there have been brief periods when difficulty was experienced in securing fishermen, because of their scarcity, but these have occurred rarely, and comparatively little trouble has resulted.

Mackerel Fishery. — As a whole, the mackerel fishery has not been successful during the season of 1904. Bad weather in the early spring made the southern shore fishery unprofitable as compared with other seasons, although the drifters, operating gill nets, did fairly well. Later it was claimed, apparently with good reason, that the repeated discharge of heavy guns from warships engaged in target practice off Noman's Land scared away the mackerel in that vicinity, and scattered them to such an extent that a profitable fishery was destroyed.*

* It is a fact well known to all familiar with the mackerel (*Scomber scombus*) that it is extremely sensitive to noises, especially those of an explosive nature. In those days when the mackerel was taken chiefly with hook and line, care was ob-

The fogs of summer and the greater or less scattering of the mackerel on different feeding grounds had their influence on the season's catch, which was further limited by the early departure of the fish in the fall.

Thus, while it is true that the season did not actually close until after the middle of November, some of the seiners remaining late on the Nova Scotia coast or off Cape Breton, in hopes of making a big catch, it is nevertheless a fact that the mackerel fishery practically came to a close before the end of September. Some time before that date there was ample evidence of the departure of the bulk of the fish, and several of the vessels early abandoned the pursuit of mackerel and promptly entered into some other branch of the fishery. From this time until late November gales brought in the last stragglers of the fleet, the vessels dropped out, one by one, to go elsewhere, until only a few were left to hunt for the evasive schools of fish that were occasionally reported here and there, but which, with slight exception, the wild fierce gales of autumn protected from capture by fishing schooners.

The early fleet got away as usual for the southern fishing grounds. Reports had reached the fishing centres of mackerel being seen north of Cape Hatteras early in March; the previous year's catch had been mostly disposed of, and, as is well known, the early catches meet with a ready demand and high prices when taken fresh to New York and other markets. All this held out the requisite temptation for the early departure of the fleet, the leaders of which were off in good season to look for the first "bluebacks" that "showed up" north of Cape Hatteras. The schooner "Ralph L. Hall," the first of the fleet to sail, was reported to have started March 26; but,

served that little noise should be made on board a vessel lying to with a school of fish alongside. Anything falling heavily on deck, and making a sharp, resounding noise, would almost surely drive away mackerel, however contented and peaceful they had previously been. For this reason, and because it seems probable that the discharge of heavy ordnance, that might be heard many miles, would frighten mackerel and drive them from waters ordinarily frequented by them, it is regrettable that some other part of the ocean has not been selected for target practice, — a part of the Atlantic where such operations will not disturb an industry, and give rise to complaints that the welfare of poor fishermen is of little consequence to a rich and powerful government. For, however little justification there may be for such a charge, the continuance of such operations, in spite of protest, leaves a bitterness in the hearts of many who feel they have unnecessarily been robbed of their bread while helpless to defend themselves.

because it was known to fishermen that the moon during April would not be favorable to night fishing, the majority did not hurry to get away as early as usual.

It was not the fault of the enterprising fishermen that their efforts were not sooner rewarded. But bad weather and other unfavorable conditions defied skill and determination, for fish could not be seined in gales or under other unsuitable circumstances. A few small captures were taken reasonably early in the season, but weeks went by with little result outside of catches made by the gill netters, whose operations were less interfered with by the weather than those of the seiners. Thus the "cream of the season"—that period when large catches and big prices are often secured—went by without big hauls by the seiners being reported. As late as April 23 it was reported in the press that "the catch of fresh mackerel by the fleet to date has been 855 barrels,"—a very small amount; also that "the mackerel fleet has had . . . during the past week . . . no luck at all. Owing to the unfavorable weather, the fleet has landed no mackerel."

Some fine catches were made later in the spring than usual, and a few of the seiners did well; but the chief profit obtained was secured by the little drifters that carried only a few men each. Although their catches were small as compared with those of some of the larger craft, they were more uniform, more equally distributed, and, being shared in by smaller crews, gave an average profit that compared favorably with that earned by the men on the big schooners. A part of this success of the gill netters was due to the fact that the early catches made by them sold for high prices,—prices much higher than usual, because the seiners were doing so poorly. The men on one of the netters, which stocked \$3,100 on her southern trip, shared \$203 each. The claim was made that the schooner "Florida" was high line of the drift-net fishing craft on southern grounds; her crew shared \$375 each. The schooner "M. Madeline" also did well; she stocked \$3,500 with a crew of 8 men, each of whom shared \$235. The little schooner "Motor" was another "lucky" one; she arrived home from a netting trip to southern grounds July 8, up to which date she had stocked \$4,000, her crew sharing \$350 each.

The first mackerel of the season to arrive were landed at Fortress Monroe, Va., on April 7, by the auxiliary schooner "Victor" of Gloucester. Her catch was reported as only 29 barrels, these having been caught about 30 miles east of Cape Henry. The auxiliary schooner "Saladin," also of Gloucester, made a catch of 8,000 fish—about 75 or 80 barrels—on the same day the "Victor" took hers; but carried them to New York, where she arrived the day after the "Victor" reached Fortress Monroe. It was also reported that the schooner "Rival" likewise caught a fare of mackerel at the same time and place, but while on her passage to New York she ran aground on Brigantine Shoal, off the New Jersey coast, and was wrecked. As already shown, adverse conditions prevailed the larger part of April; and, although an occasional good fare was pulled out of the stormy sea, like a brand snatched from the burning, comparatively little was done until after the first of May. Then the fish had moved toward the east end of Long Island and off Block Island, consequently much of the catch was landed at Newport, although many fish were carried to New York. As the mackerel moved to the grounds off Block Island and vicinity they were not only eagerly followed by the larger vessels of the fleet, but as early as May 10 it was reported that fully 100 boats—sailing and auxiliary—were in the waters of Vineyard Sound, awaiting the appearance on near-by fishing grounds of the schools of mackerel which had been reported a few days previously off Fire Island, and swiftly passing eastward along the Long Island shore. Immediately thereafter, on May 13, many arrivals of mackerel at New York and Newport were reported. Among the most notable of these were the following: the schooner "Norumbega," with 500 barrels; "Annie Greenlow," 250 barrels; "Constellation," 285 barrels; and several others with fares ranging from 100 to 220 barrels. For the week ending May 14 it was claimed that the fleet landed 6,904 barrels of "large, fresh mackerel," of which 3,148 barrels were brought to market by the netters and 3,756 by seiners. On May 16 another large list of arrivals was noted, but mostly with small fares. The schooner "Pinta" was reported to have landed 260 barrels, but that was the largest catch.

Early in May some of the mackerel schooners abandoned the fishery on the southern grounds, came home and fitted for the so-called Cape shore fishery, — off the southern coast of Nova Scotia. The first to sail for the Cape shore got away on May 11. Many fine fares were secured while the fish were passing eastward, which added materially to the incomes of the season. On June 4 it was stated that for the week ending that date the fleet landed 5,554 barrels of mackerel, all of which were fresh except 85 barrels. On June 7 the schooner "Victor" arrived at Gloucester from the Cape shore with a fare of 700 barrels of mackerel, according to the Cape Ann "News" of June 8, 300 barrels of these being salt fish and the remainder fresh. The "Saladin" landed 200 barrels at Newport on June 6, and the next morning was in port again with 200 barrels more. On June 7 the schooner "Lena and Maud" landed 15,000 fresh mackerel and 300 barrels of salt fish; the "Ralph L. Hall" was reported in same date with an equal quantity; the "Natalie J. Nelson" with 325 salt and 15,000 fresh mackerel. Two days later the following "rousing fares" were landed: schooner "Lena and Maud" of Gloucester, 550 barrels; "Natalie J. Nelson," Gloucester, 600 barrels; "Ralph L. Hall," Gloucester, 550 barrels; "Kentucky," Gloucester, from a two-weeks trip, with fare sold for \$4,347.88; "Constellation," Gloucester, from a two-weeks trip, with stock of \$5,669; and "Saladin" with 200 barrels. On June 12 the schooner "Grayling" arrived, with 275 barrels of salt mackerel and 10,000 (equal to about 100 barrels) fresh fish. The next day it was reported that the schooners "Avalon" and "Priscilla Smith" each landed 500 barrels.

The schooner "Bertha and Pearl" of Gloucester was reported on June 13 to be high line of the mackerel fleet for the season to that date, she having stocked \$10,187.76 as a result of her fishery on the southern grounds and on the Cape shore. Her crew had shared \$250.04 each. Eleven days later, June 24, the honor of having been high line of the fleet was claimed for the auxiliary schooner "Saladin," which at that date had earned a stock of \$13,403. But this distinction was temporary, for on July 15 the "Bertha and Pearl" arrived, with 15,000 fresh fish and 275 barrels of salt mackerel, and was again acclaimed "high line of the fleet."

The new schooner "Lucania" was reported as having arrived on June 2 with 20,000 fresh mackerel and 320 barrels of salt fish. The mackerel fishery off the southern coast of Nova Scotia, or Cape shore, is of short duration, for the fish are migrating, and pass rapidly eastward on their way to the Gulf of St. Lawrence. In recent years they apparently break up into small "pods," or scatter and disappear after passing through the Strait of Canso or around the eastern end of Cape Breton Island. It was stated that the mackerel fishery at the Magdalen Islands in the early summer of 1904 was an absolute failure. "There had not been a single mackerel seen" there prior to June 15, it was reported; and those who went there to catch mackerel in gill nets were compelled to go elsewhere to fish. A report was brought in, moreover, by the crew of the schooner "Moween," which arrived at Gloucester on June 22, that, while they were trawl fishing for cod off Anticosti, "mackerel of the largest size would follow the fish on the trawl to the surface, and they could be seen passing under the dory almost continuously." They believed there were large quantities of mackerel in the Gulf of St. Lawrence; but subsequent results did not prove that they were taken there in great numbers.

As usual, the early catch of mackerel was sold fresh, and newly caught salt fish did not appear in the market in quantity until after the middle of May.

The fishery on the Cape shore had barely ceased, indeed, the last of it was probably still in progress, when large bodies of mackerel were found off Noman's Land, migrating slowly in the direction of Georges Bank. Therefore, as soon as there was a cessation in the fishing south of Nova Scotia and Cape Breton, the vessels piled on canvas and drove away to the south-west for new fields on Georges. Thus, while on July 9 it was reported that the fares of salt mackerel landed the week previous were from off Noman's Land, the statement was made a week later that "the fleet is now mostly on Georges. . . ."

Meantime, some fine fares of mackerel had been taken on Georges, for whereas the market reports on July 12 complained of a scarcity of fish of this species, numerous arrivals were noted three days later. Among these were the following: schooner "Faustina" of Gloucester, reported July 15 as having

stocked \$4,755 on her trip, her crew sharing \$112.57 each; schooner "Norumbega," stock \$3,477, share \$83.47; "Lelia E. Norwood," stock \$2,273, share \$65.11; "Natalie J. Nelson," stock \$3,662, share \$81.14. Mention has already been made of the fare brought in on same date by the "Bertha and Pearl." It was stated on July 18 by the Cape Ann "News" that this schooner had "just completed another successful mackerel trip." Her stock on the trip was \$5,800; share, \$141.50. Up to that date the "Bertha and Pearl," it was asserted, had made a stock for the season of three months' fishing of \$16,000, and the crew's share amounted to \$395 each, — a result rarely equalled in the same length of time. The same date, July 18, the schooner "Pinta," which had been absent from port only forty-eight hours, was reported to have arrived with 22,000 mackerel, that sold for 12 cents each; the "Gossip" was in, with 5,000 fresh mackerel and 320 barrels of salt fish, which stocked \$4,000 in round numbers, share, \$90; "Electric Flash," with 280 barrels; and "Victor," with 165 barrels of salt and 15,000 fresh mackerel. This fare, according to the Gloucester "Daily Times," brought the stock of the "Victor" up to \$17,000 for the season, and, temporarily at least, made her high line of the fleet. The fact also appeared in the press at this time that the schooner "Ralph L. Hall" had made a season's stock to date of \$14,700; and a stock on her last trip, landed shortly before, of \$5,747, her crew sharing \$117 each.

The schooner "Grayling" was among the leaders, for on July 27 she was credited with having stocked nearly \$16,000 for the season, and was reported to have stocked \$3,238 on a fare landed just previous to that date, her crew sharing \$72.88 on the trip.

The Gloucester "Daily Times" of July 23, 1904, reported that the schooner "Lewis H. Giles," "on her recent seining trip," stocked \$6,071; her crew shared \$134.36. This proved to be one of the best fares of mackerel of the season.

During the brief season of good fishing, sharks were exceedingly abundant and troublesome; and the mackerel on Georges soon grew wild and more or less scattered, so that there were few large fares landed after July, and the good catches in

August and later were rare. The schooner "James and Esther," which was reported as arriving with 12,000 fresh mackerel caught in the South Channel, was "a rarity at T wharf" then. The fact that the fish sold for 20 cents each is sufficient to show the scarcity of mackerel at that time. The fleet vainly hunted the fishing grounds over, from Block Island to the east coast of Cape Breton, in search of large schools of mackerel. At first the waters of the Gulf of Maine and further south were harried from Block Island to Nova Scotia; and, as the season advanced and migrating mackerel were expected to put in an appearance off the Cape Breton coast and along the south shore of Nova Scotia, some of the fleet went there, with the hope of success. Little was accomplished, however, on any of the fishing grounds after midsummer; and the only important catch of a seiner in the late fall was made by the "Victor," which was reported to have taken 125 barrels off the Cape Breton coast early in November. On the night of November 9 a catch of 1,400 big mackerel was made by the gill netting schooner "Grace," between Gloucester and Cape Cod; but the fish were evidently moving rapidly, for no other good catches were reported. On November 18 the last of the seiners were reported as arriving home, except one,—all empty except the "Victor." Under all the circumstances, it is remarkable that so many fine fares were landed and such excellent stocks were earned by some of the vessels. The results secured indicate unmistakably that nowhere else in the world has greater skill, enterprise and efficiency been shown in the fisheries than was displayed in the Massachusetts' mackerel fleet during the season of 1904; and nowhere else can be found such efficient apparatus for capture, and such swift, powerful and quick-working sailing vessels as those constituting the bulk of the fleet.

Perhaps the most remarkable feature of the fishery has been the notable display of skill, tireless energy and determination exhibited for the second year in succession by Capt. Joseph Smith, master of the schooner "Bertha and Pearl," who, although now three score and ten or thereabouts, has exhibited endurance that could reasonably be looked for only in the hardiest young men. It is no child's play to compete for high

line honors in the mackerel fleet; and he who wins or comes near winning can maintain his position only by a happy combination of qualities of mind and body that are sufficiently rare in the comparatively young to make them little short of marvellous in one who has reached the time of life when the average man is utterly incapable of such extraordinary exertion, exposure and endurance as are required. It is the limit of strenuosity for the strongest, and rare indeed is it that one of advanced years is equal to the extraordinary strain.

The highest mackerel stocks of the year, as reported to us, are as follows: schooner "Grayling" stocked \$21,547, crew shared \$475.18 each; schooner "Victor" stocked \$20,000, in round numbers; schooner "Marguerite Haskins" stocked \$18,372, crew shared \$392.53 each; the stock of schooner "Bertha and Pearl" was reported to be between \$18,000 and \$20,000, but was probably close to the former figure.

The total catch of mackerel by the New England fleet during the season of 1904, as reported to the Boston Fish Bureau, was 75,125 barrels, of which 28,323 were salted and 46,802 barrels were fresh fish. The catch was 39,533 barrels less than that of 1903, — a material falling off. The proportion of the catch marketed fresh is only slightly in excess of that of the year previous, it being in excess of 62 per cent. in 1904 and above 60 per cent. in 1903. It is probable that a larger percentage would have gone to the market fresh this year, except for the fact that so large a part of the catch was taken on fishing grounds remote from markets, and often in such small quantities that it was inadvisable to "run in" such small lots fresh.

The best fishing from southern Massachusetts — from ports on Buzzards Bay, Vineyard Sound and adjacent waters — was a complete failure this year. The fishermen believe their success was destroyed by the target practice of warships.

The annulment of the rule of the Treasury Department, whereby a duty was assessed by government officials on the brine in which imported mackerel were cured, was a matter of much moment to those engaged in the importation of foreign-caught fish.

The Bank Cod Fishery. — This year has been an exception-

ally unfavorable one for the cod fishery on the eastern banks. The scarcity of the cod and the difficulty attending the procurement of bait, coupled with an unusual if not heretofore unknown abundance of the dogfish on the far eastern fishing grounds, were obstacles to the obtainment of good fares that few could overcome. But, while the bulk of the fleet brought home "half fares" or light catches, a few of the schooners were fortunate enough to secure large fares; because of the high prices, they made big stocks which compare favorably with those of previous years.

The first vessels got away early; a few were reported to have sailed before the end of February, despite the severe temperature. They were not much helped, however, by this early departure, for after they called at Nova Scotia ports to take on board part of their crews, the schooners were frozen in and had to lie in harbor until milder conditions released them.

The outfitting of bankers continued until May, although the majority of the fleet got away before that date; for cured fish were reported extremely high in March, and the temptation was great to get fares home early.

To what extent the dogfish interfered with the presence of bait species along the provincial coast, or whether it was responsible for the scarcity of cod on the fishing grounds east of Cape Sable, cannot now be determined. It was, however, reported as unusually abundant in those regions; as bothering the fishermen on the Grand Bank and as far north as "Baccala Bank" on the east coast of Newfoundland; and fully up to its reputation in voracity and destructiveness. If such statements were correct, there can be little doubt of the evil influence of a species the presence of which in great numbers on any fishing ground invariably causes there a scarcity of the fish it preys upon. It therefore follows that herring, squid and other bait species may have been less abundant than commonly, because of the extraordinary plentifulness of this pest of the fishermen, and a like influence may have been exercised upon the cod. The wonder is that both cod and bait species were not utterly driven from their usual haunts when the dogfish appeared, — a result generally looked for when it swarms on fishing grounds further west. But, whatever the evil effect

of the dogfish, it appears that neither the cod nor bait species were completely driven away; consequently, in a few cases the fishermen did well.

An innovation in the cod fishery which attracted much notice was the successful use of a seine for the capture of fish on the banks. The schooner "Maxine Elliott" of Gloucester was the pioneer in this new departure. She sailed April 11 for the fishing grounds near Sable Island; and, while her master had been one of the prominent captains in the dory hand-line cod fishery, he was equipped on this trip with a seine of special design for catching codfish or related species in the shallow water and on the smooth bottom near Sable Island, or more especially its long, shallow sand bars, that stretch out miles from each end of the island. In late spring or early summer schools of cod and pollock often appear in shallow water on these bars, and can be seen in two or three fathoms in large numbers. Frequently they will not bite a hook, whatever the lure. Sometimes the pollock are said to be very numerous above the cod, and so ravenous that it is nearly impossible to get a baited hook to the bottom without it being first taken by the fish at the surface.

In addition to a full equipment for dory hand-line fishing, dories and all, a mackerel seine boat was carried on the "Maxine Elliott" to operate the big net.

The "Elliott" arrived home June 23, and brought in a fare of 275,000 pounds of salt fish, more than half of which were pollock. The experiment of seining fish on the bars of Sable Island was successful, especially so to the extent that it was a method of cod fishery which could be pursued without bait. In future years, when the proportion of cod is larger, the results may be more gratifying.

The unusually small catch of cod on all the eastern banks the fishermen attribute to the notable scarcity of bait in mid-summer, and likewise to the remarkable scarcity of cod, and windy weather in later weeks or months, when the cod fishing season was nearing a close.

In spring herring were plentiful, as usual, at the Magdalen Islands, and schooners that went there for bait easily got a supply. But the herring resorts to these islands at that season

solely for the purpose of reproduction, and when it has spawned it scatters or goes elsewhere; thus its season is short, and it can be relied on for a bait supply in this region only a few weeks. It is seldom the second supply of bait can be secured, unless a vessel is fishing near by, and more rarely that the same schooner would get herring bait at the Magdalens three times in succession. Capelin appeared at the usual time on the Newfoundland bays and harbor, but they were scarce; and left the coast sooner than common. While capelin could be secured for bait the vessels obtained good cod fishing. The squid, which is chiefly relied upon for a bait supply, reached the coast late, and it probably has seldom if ever been so scarce and difficult of procurement. Ordinarily this bait species can be taken in considerable numbers on the banks, especially on the Grand Bank; but there is a unity of statement to the effect that the fishermen have never known squid so scarce on the Grand Bank as this year. It was impracticable to get enough bait at sea to meet the requirements. Much time was spent in discouraging efforts to obtain bait; the schooners were driven from point to point on the coast, and every device known to the fisherman's skill was employed to overcome the difficulties met with, but often without success. Under all the circumstances, it was fortunate that the men of the crews bore the delays and disappointments so well as they did. There is good authority for stating that little difficulty was experienced with the crews. This is decidedly creditable to the fishermen.

The limits of this report preclude mention of much that would be interesting and instructive. Suffice it to say that, notwithstanding almost insurmountable obstacles, a few schooners were lucky; they obtained good fares, and those particularly which landed fine catches in late autumn earned stocks more suggestive of a prosperous season than of a period remarkably lean and unsatisfactory.

Following are some of the most notable fares and stocks: the schooner "Elector" of Gloucester was high line of the bank cod fishing fleet. As a result of two trips to the Grand Bank, she landed 500,000 pounds of salt cod, earned an aggregate of \$18,535.06, and each of the sharesmen received

\$615.77.* She sailed March 2, and arrived home from her last trip on October 27. The next best catch appears to have been made by the Gloucester schooner "Aloha," which is credited with landing two fine fares and stocking \$18,315.41. Her crew of 22 men each shared \$347.44. The schooner "Hazel R. Hines," as a result of two trips, stocked \$17,312.10. Capt. Joseph V. Cusick of Gloucester, in two vessels, the "Helen G. Wells" and the new schooner "Independence II.," secured a good stock. He sailed February 25, made two trips on the "Wells," then took command of the "new one," and arrived home from the trip in the "Independence II." on October 15. On the three trips he landed a total of 464,350 pounds of salt fish, stocked \$16,922.24, and the crew made an average share of \$328.93.† The schooner "Maggie and May" landed 455,000 pounds of salt fish and stocked \$16,818; crew shared \$453.50. She did not sail so early as some other vessels.

Mention may appropriately be made of the following individual fares, taken at random, which were among the largest of the season. On June 13 there were several notable arrivals at Gloucester from the various fishing grounds, and it was designated as "the greatest fish day" the old fishing port had "seen for many months." The "Elector," whose season's stock has already been mentioned, was one of the arrivals. The schooner "Valkyrie" also brought in 245,000 pounds of salt cod. The schooner "A. E. Whyland" was reported on June 23 to have stocked \$7,845.34 from a bank fare landed just previous to that time; crew shared \$237.98 each. The schooner "Arabia" arrived at Gloucester July 19 with a fare of 340,000 pounds of salt cod; she stocked \$10,985; her crew's average share was \$257.80. The schooner "Lucinda

* A part of the crew, including the master, ordinarily designated as "sharesmen," hired the balance of the men, paying them monthly wages. In such ventures, which have long been common on bankers, the sharesmen pay the "hired men" their wages, and equally divide among themselves any profit or loss that results. A good fare, for which a portion of the crew — generally one man in each dory — has a special inducement to strive, gives each of the sharesmen a much bigger share than he otherwise would earn; while a bad catch bears with particular severity upon him who joined in the risk of hiring part of the crew.

† All the crews of the "Wells" and "Independence II." were on shares. The crews counted fish, and the two men in each dory shared according to the fish caught. The high-line shares were more than the average as above given.

I. Lowell" arrived the same day at Gloucester from the Grand Bank with a fare of 281,000 pounds of fish; stocked \$9,100; sharesmen made \$330 each. The schooner "Hazel R. Hines," which arrived at Gloucester the day previous, landed a fare of 290,000 pounds; stocked \$9,500. This was the maiden trip of the "Hines," and stamped her a "lucky vessel" in the eyes of the fishermen. The schooner "W. E. Morrissey" of Gloucester, which arrived about this time, landed 204,000 pounds of salt fish; stocked \$9,300, and her crew earned from \$316 to \$346 each, according to the amount of fish taken in each dory. Several other fares arrived between July 10 and 20 that were above the average, but those mentioned will indicate the maximum catches.

As the season advanced the difficulties increased, as already intimated, and fewer good fares came in. The schooner "Dora A. Lawson" was reported arriving in port October 8 with a fare of 250,000 pounds of salt fish; she had been absent since some time in March. The schooner "Mystery," which arrived from a long trip on November 1, was alleged to have a fare of 275,000 pounds of salt cod; she had sailed on the trip in the spring. The schooner "Aloha" of Gloucester arrived home from her last trip on November 21, with a fare reported to be 265,000 pounds of cod; this vessel sailed on her voyage in July, after landing another fare. The trip was remarkable, for the reason that the fare was caught chiefly with salt capelin for bait, on the Flemish Cap, the easternmost of the fishing banks resorted to for cod by our fishing vessels. In this desolate region, hundreds of miles north-east of the Grand Bank, surrounded with icebergs and no other vessel in sight, the fishery was pursued with vigor and success. The extraordinary prices prevailing when the "Aloha" arrived made her fare much more valuable than otherwise it might have been; for immediately before this, on November 19, \$4.75 had been paid for large green salt cod as taken from the vessel, and \$4.25 for medium-sized cod. These prices were paid for the fare of the schooner "Mabel D. Hines," which was reported to have landed 140,000 pounds of salt fish.

Shack Fishing. — This is a branch of bank fishing that appears to be growing in favor. It is now pursued from the

fishing grounds off the Nantucket shoals to the Grand Bank, and all, or at least a large percentage, of the catch is brought in without having been salted, part of it in a condition to be sold fresh, but the bulk of it only fit to be split and salted. Shack fishing derives its name from the fact that originally, and to a large extent now, the catch is largely made up of hake, pollock and other cheap varieties of fish, especially those of the cod family. Such fish, tumbled in together, without effort at classification, are known as "shack," and it is deemed more profitable to catch large quantities, and run them in without splitting and salting, than to observe the old-fashioned methods. The effort is to get large quantities of fish so quickly that they can be kept without salt until a full fare or nearly that is caught. Large masses of gear are used, for little time, comparatively, is required to care for the fish, which are simply eviscerated and tumbled below without ceremony. A little ice may be used to keep the fish cool, but generally they are not packed with the care that fish are which are intended for sale as fresh goods in the market. Such care is bestowed on the last of the catch, but seldom on the first fish taken. Sometimes the first caught fish are salted, especially if they are cod, and the early fishing is not especially promising; but as soon as a larger abundance gives promise of a quick trip, the splitting and salting ceases, and "a shack trip" is the dominant thought while the fishing lasts. While at first a shack trip referred particularly to a voyage on which cheap species of fishes constituted the bulk of the catch, this system of fishing has now broadened materially, to such a degree that it is common for vessels, some of them large schooners, to go as far as the Grand Bank, where cod alone are taken. With the swift schooners of the day it is entirely feasible to bring the majority of the fish in fresh, even from the distant Grand Bank; and frequently some of the last caught are in such fine condition that they go upon the market as "fresh fish," and may be sent hundreds of miles into the interior. The bulk of such fares is landed at Gloucester for salting. Shore gangs take charge of the fish, split, wash and salt them. They are salted in butts, — molasses hogsheads on end, with the upper head out, — and after a week or two can be made ready for

drying on flakes, although they usually remain longer in salt. The butts are filled with brine, and fish salted in this manner are known as "pickle-cured fish." They enter extensively into the boneless fish trade.

There is as much rush and drive in discharging a fare and outfitting for another trip as is characteristic of the fishing. No time is lost. While the fish are going over the side on to the pier, being weighed and otherwise disposed of, the stores for another trip are going on board, messages to baiting stations are sent off, or whatever can be done in preparation for another voyage is promptly attended to. No sooner are the fish out and the deck and hold well washed, than salt and ice are taken on board, and whatever remains to be done is promptly attended to. If salt must be obtained from a ship moored in the harbor, a tug is alongside at the earliest moment, and no time is lost. Discharging a big fare usually takes a whole day, or nearly that, hence there is one night home in such an event. Other than this, or the time necessary for repairs, painting and the like, there is little pause, for the rivalry is intense. The struggle to lead in this as in other branches of fishery generally produces an intenseness of effort rarely equalled elsewhere.

Following are brief notices of a few of the catches: on May 9 the schooner "Dido" arrived with 145,000 pounds of fresh pollock, and the "Metamora" with 110,000 pounds of mixed fresh fish. Two days later the schooner "Samuel B. Crane" brought in 120,000 pounds of fresh fish, chiefly cusk, from the Bay of Fundy fishing grounds. Early in June the Gloucester schooner "Slade Gorton" landed a shack fare that gave her a stock of \$3,372; each of her crew shared \$89. Just before the middle of June the schooner "Claudia" stocked \$2,672 on a shack trip; her crew shared \$71.30 each. At the same time the schooner "Monarch" landed a fare that sold for \$2,376. On June 22 the schooner "Moween" arrived at Gloucester from a shacking trip to the Gulf of St. Lawrence with 140,000 pounds of fresh fish. Her fare was chiefly cod, caught near Anticosti Island, where the fish were unusually large. The presence of a bountiful supply of bait and complete absence of the dogfish were specially helpful conditions

on the trip.* Just before the middle of July the schooner "Orinoco" stocked \$2,900 on a fare of shack she landed; crew shared \$55 each. About July 20 the schooner "Arbutus" landed a shack fare that realized a stock of \$3,024; crew shared \$72.31. Early in September the schooner "Muriel" had a shack fare that stocked \$1,670; crew shared \$30.70. Other good fares might be mentioned, but these will suffice to show the scope and character of the best.

It is difficult to give anything like high-line stocks or catches of vessels employed in the so-called shack fishery. Such employment is temporary at best, and often is so closely associated with the deep-sea market fishery that both are seemingly engaged in at the same time on board the same vessel. Then a vessel which may go "shacking" on one trip may be market fishing the next week; and if she spends the summer in shack fishing, she is almost certain to fish for the market the balance of the year.

Georges Fishery. — The cod fishery on Georges Bank, long celebrated for the disasters associated with it, is one of peculiar interest to Massachusetts, for vessels from no other State engage in it.

The better class of vessels now employed in this fishery has robbed the industry of its terrors, to a large degree; for, whereas more or less vessels formerly foundered in each recurring severe gale, going down with all hands, few losses now occur, and the Georges fishery is as safe as any.

Probably owing to the comparative scarcity of dogfish in summer, the fishery on Georges was exceptionally good. At seasons when few fish are ordinarily taken, comparatively large fares were caught this year. It was not uncommon for fares of 30,000 to 45,000 pounds, or even more, of fish to be brought in by the schooners; and the high prices that prevailed enabled the vessels to make fine stocks and the men to earn good pay. A few examples must suffice for illustration: the record trip for the season was that made the latter part of September and first twenty days of October, by the schooner

* The crew of the "Moween" reported that large mackerel frequently followed their trawls to the sea surface, and it was not uncommon for the men to see mackerel passing under their dories while they were engaged in fishing.

“William H. Moody.” She was absent from her home port, Gloucester, about five weeks, and landed 30,000 pounds of halibut, in round numbers, — 14,000 pounds of these at Portland, — and 15,000 pounds of cod. She stocked \$3,400, and her crew shared \$112. August 6 the schooner “Caroline Vought” arrived, with 40,000 pounds of salt cod.

The Market Fishery. — On the whole, the deep-sea market fishery has been successful. To a considerable extent this has been due to an unusual midsummer scarcity of the dogfish, and a consequent large summer catch of ground fish (cod, haddock, hake, pollock and cusk) by the vessels bringing those species fresh to the market. As a matter of fact, there was often an over-supply of such fish in midsummer, with consequent low prices, which led to the necessity of splitting large quantities of fish, and thus resulting in much dissatisfaction. The dealers at least ascribed the over-supply of fresh ground fish to the abnormal scarcity of the spiny-backed dogfish. Their inability to market the remarkable summer catch of cod, etc., and the resulting disarrangement of prices, even induced many to emphatically express their desire for the return of the dogfish, and the consequent balancing of the supply and demand of market fish of the deep-sea, bottom-feeding varieties. The unusual catch of the schooners supplying the regular market was supplemented to a large degree by the great quantities of marketable fish brought in by the shack fishermen, or by vessels fishing chiefly for cod but taking the larger part of their catch to port fresh, with the hope or expectation of selling a considerable portion of it as market stock. It will thus be seen that, aside from the fares of the market vessels, which were large, as we have stated, supplies of fresh fish were being brought in by schooners arriving from all the fishing grounds from Nantucket Shoals to the Grand Bank of Newfoundland.

There have been many periods of scarcity, for a few days at a time, due to bad weather or difficulty in securing bait, but the summer fishery was remarkably prolific. Fares of fresh fish ranging from 10,000 pounds to well above 100,000 pounds were frequently reported. It does not follow that all of the fish brought in were taken for market use. Indeed, the contrary was true, for millions of pounds in the aggregate went

to Gloucester, after having been in Boston, and were sold for splitting and salting.

Inspection of Fish. — There have been no requests during the past year for the inspection of fish, under chapter 138, Acts of 1902, and no fees have been received.

THE HATCHING, REARING AND DISTRIBUTION OF GAME FISH.

Appropriations. — Inasmuch as the general fund available for fish culture is included in the general appropriation, it is not practicable to give any more than an estimate of the amount required for this branch of the work ; it did not vary materially from that of last year, which was about \$6,800. The appropriations for stocking ponds and brooks under special acts remain the same, viz., \$500 for ponds and \$300 for brooks.

We can only repeat: "It has been found in practice that the amount estimated for the cost of distributing fish is not sufficient ; the utmost economy has failed to make it cover the expense." But, inasmuch as the allotment is included in the general appropriation, the fish are distributed by our salaried deputies, who for the time being act as messengers ; and, while sufficient means are available to pay their travelling expenses, the public is served. If the purpose of the Legislature is thus fully carried out, it seems to matter little if the estimate for this special work comes short of actual requirements.

The allotment of \$500 for stocking ponds is insufficient. It was ample years ago, shortly after the enactment of the law, and when the demands upon the commission for stocking ponds were about one-fourth or one-sixth of what they now are. But full compliance with the public requirements is no longer possible with this appropriation. For instance : we have been earnestly besought to stock certain waters with white perch, — a reasonable and proper request, if, as is sometimes the case, this species is by far the most desirable for certain waters. But, as a rule, we have been compelled to neglect such requests, although we would have preferred otherwise. With a maximum of work to do, however, and only the funds provided for a minimum, it has clearly been necessary for us to take the available fish from our hatcheries, rather than to attempt the more expensive method of collecting white perch

from Mill Pond on Cape Cod, and transporting them long distances to ponds in other sections of the State. It is true that the fish available are doubtless the best in most instances; but there are cases where white perch could, we think, be used more advantageously, if the means justified the necessary expenditure. We hope to meet the demand in the near future, at least in part, by the artificial propagation of white perch; but even that will not suffice to make adequate the sum of \$500 to do the work now required, and which ought to be done promptly and efficiently. In our opinion, a pond or lake which has been stocked and the fishing therein regulated in accordance with law, should be additionally stocked each recurring autumn, while the regulations are in force, in order to bring the fish life into a satisfactory condition. But it requires no argument to show the impracticability of this, when our resources are strained to the utmost to meet the annual demands in other directions. The remedy lies with the Legislature. We have done and can do many times more than was deemed possible a few years ago; but the limit has apparently been reached, beyond which it is not practicable to go to any considerable extent, if at all.

The demand for stocking streams under section 5, chapter 91 of the Revised Laws, is not large, and seemingly does not grow in popularity. We can conceive of conditions which would make the application of this law highly beneficial. But, while it is easily possible, through stocking and regulation of fishing for three years, to bring the fish in a stream to the highest point of abundance, — when there are as many trout as can live comfortably in a brook or that the food resources will sustain, — it is evident that when all restriction on fishing is removed, at the end of the close season, there will be a rush to the stream for the “early catch,” with the result that the trout are soon depleted, and the effort of years to increase fish life is nullified in about as many days. It is probably because of this that this system has met with so little favor. To the majority, a few days’ fishing and subsequent barrenness is not sufficient recompense for yielding to years of restriction. If there was some way of conserving a reasonable amount of the abundance created by self-denial, no doubt the special law for

stocking streams would be better appreciated. This is a matter which the Legislature may justly consider.

The allowance for stocking brooks has been ample; it has not all been used.

The improvements made at the stations have resulted chiefly from the work of the regular employees. The amount of extra labor, such as teaming, etc., has been small.

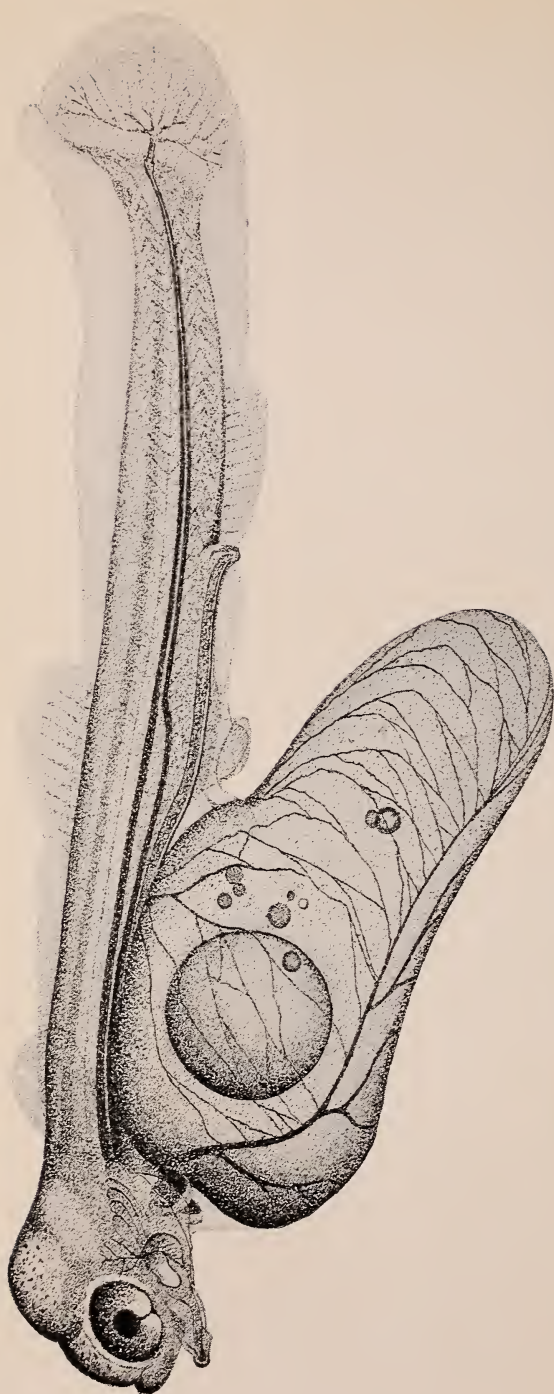
On the whole, the utmost economy has been observed, and it is believed the largest possible returns have been secured for the money expended.

Expansion. — For several years past it has been customary to establish a new annual record in fish culture, despite the fact that the limit of practical effort seemed to have been previously reached. Such is the case this year, when a new and gratifying record has been made. This has been accomplished, too, in spite of obstacles, and notwithstanding limitations in some directions that could not be overcome.

There has been notable progress in the work of breeding and distributing fish. There was a single important exception to this. Because we were unable to secure any landlocked salmon eggs from the United States Fisheries Bureau, we have been unable to breed that species as extensively as usual. The few eggs obtained from our own salmon, the majority of which were infertile, were not of large consequence.

The fact that only a few fry were retained at the Hadley station for raising fingerlings, — kept more in the nature of a forlorn hope of experimentation than with any expectation of success in raising them, — and that the work of this nature was thrown entirely upon the Sutton hatchery, made the outlook at the beginning of the year not encouraging. It was feared the record could not be maintained. That it has been nearly equalled is cause for satisfaction.

The conditions at Hadley still continue disquieting, and somewhat remarkable from some points of view. Fry in their early stage, say up to the time of the spring distribution, which occurs in April, grow remarkably; the Hadley trout fry are the best we have at any hatchery in the State, — large, healthy and vigorous. The dangerous period is between the fry and fingerling stages. It may be true that the mortality



ATLANTIC SALMON JUST HATCHED—Drawing from life by Chas. Cecil Joselyn.

this year has been less than ever before, but the fact remains that the critical period is between April and September, during which time the temperature of the water at Hadley is too high for the successful rearing of young fish. When the water grows cooler with approaching autumn the danger ceases, and before the season is far advanced the next year the yearling fish have so far developed in growth and vigor that they are thereafter immune from the danger that threatened them during the first summer. Indeed, yearling fish thrive well, and nowhere can finer examples be found than some trout we have raised this year at Hadley. Adult fish also do well.

Efforts have been made to determine the cause of the excessive mortality to young fish, which is believed to be attributable chiefly to parasitic attacks, although the temperature may likewise have a deleterious effect. For this reason we were glad to avail ourselves of the voluntary services of Mr. Charles C. Jocelyn of Bucksport, Me., an expert on fish diseases, who chanced to be temporarily in Boston. He went with us to Hadley, obtained specimens of the fry and water, made a tentative microscopic examination, but could not determine, without further investigation, the exact nature of the malady. It was, however, fairly well ascertained that the trouble was due to a very minute parasite attacking the gills of the fry in such a manner as to soon cause death.

In this connection it may be stated that Mr. Jocelyn also visited the Sutton hatchery, where he obtained specimens of trout afflicted with throat disease,—a form of disease that has attacked our fish virulently at that station, causing the loss of many. Trout thus attacked soon develop an ulcerated sore at the throat; the ulcer rapidly enlarges, the flesh sloughs away and death shortly ensues. Fish are promptly removed from their fellows as soon as the earlier symptoms of this fatal disease appears. Fig. 1 is an illustration of a salmon afflicted with throat disease, as our trout are; it is from a drawing made by Mr. Jocelyn, who kindly permitted us to use it for this report.

The work at Sutton has been reasonably satisfactory; it has been an advance on the previous year, but not quite up to former records in the important item of raising fingerlings. If

in the future it is possible to accomplish more in this direction at that station, an unexpected result will be attained; nevertheless, all possible will be done to reach the highest practicable limit. But there is a much wider possible range in breeding fry, which we hope to more fully occupy in the future. Meantime, Sutton has established a record in various directions, and has fully maintained its reputation for doing its part in increasing the fish-cultural work of the State.

Output of Fish.—Two carloads of shad fry, aggregating 6,100,000, were planted in the rivers of the State. One load was put into the head waters of Taunton Great River, where a similar planting was made in 1902, and the other lot went into the head waters of Parker River. The young fish were received in fine condition from the United States Fisheries Bureau, and there is reason for anticipating the happiest results in consequence of this effort to stock our streams which flow into the Atlantic, and are reasonably free from pollution or other serious menace to fish life. It is believed that those difficulties which exist can be readily overcome, and this is a matter which will receive the earnest and active consideration of the commission. If, because of stocking with shad and as a result of efforts made in other directions, the minor rivers can be made to contribute to industry and to supply their quota of delicious and nourishing fish food, an important object will have been accomplished in the utilization of our natural resources.

A consignment of 5,000,000 pike perch eggs was also received from the Fisheries Bureau. From these 3,300,000 fry were hatched, and those were planted in several ponds.

The largest aggregate plant, so far as numbers are concerned, was that of 16,000,000 landlocked smelt eggs. These were distributed in various ponds which had previously been stocked with landlocked salmon, or which were coincidentally being stocked with that species.

Carp were distributed from the Winchester Pond to Mrs. Rice of Ipswich, Mr. Hobbs of Essex and Mr. Harry Russell of Pittsfield. About 200 fish in all were given to these parties. Some experiments were made in shipping the fish to Pittsfield, with the object of saving expense in transportation.

As a preliminary, 12 carp were first placed in a box with wet moss. At the end of twenty-four hours the box was opened, and 9 of the fish were found alive. About 130, including the 9 that were taken from the moss, were then put into cans with water about 5 inches deep, and sent to Pittsfield with a loss of only 1 in transportation. This method of shipment materially reduces the expense of distribution of carp, and limits it to the cost of catching the fish and a comparatively small charge for expressage.

In connection with this subject, we deem it proper to invite attention to a matter which may be interesting to many. There is a chain of ponds extending from Woburn to Medford, and they are connected, in Winchester, by a flowed mill pond, covering some 50 acres. A dozen years or so ago these ponds were heavily covered with algæ; the surface of them was covered with green aquatic grass, through which only glimpses of water could be seen.

Some time previous, 8 carp, weighing from 1 to 2 pounds each, were put into the upper end of this stretch of ponds. The carp increased with wonderful rapidity, until the pond became well stocked with them, several having been taken with hook and line which weighed from 12 to 20 pounds each. With the increase of the carp the algæ disappeared, until now there is scarcely a visible trace of it. The chairman of the Board of Health states that the conditions around the ponds have not materially changed, and there is no doubt that the disappearance of the algæ is due to the carp, which feed upon it.

It is a question for consideration whether many of our ponds wherein aquatic growths are overabundant may not be improved by the introduction of carp to feed on the vegetable matter which otherwise decays and pollutes the water, rendering it offensive. From their vigorous breeding the carp would also furnish food for the native game fish.

The fact that high official authority has so recently declared that the carp, although a non-carnivorous species, is a fine game fish, and yields much sport to the angler who fishes for it with hook and line, seems to place it in a different category from that it has heretofore occupied. That it ranks high as a commercial

species, with wonderful reproductive powers and a rapidity of growth beyond that of ordinary fresh-water fishes, is well known; that it will keep down a harmful overgrowth of aquatic grasses is also true; and now that the carp is declared a game fish, it seems to have much to recommend it to public attention.

Frog Rearing. — The question of breeding frogs as an element of work in connection with fish culture, and distributing the young as we distribute fish fry, is a matter which the commission has seriously considered. It is of course a well-known fact that the frog is a marketable product of no little importance; it is consumed largely for food. This being the case, it seems right and proper that what otherwise may be waste water resources, such as swampy lands, shallow pools, etc., should be utilized in frog farming, if it is demonstrated that this can be successfully accomplished. Thereby an additional source of income can be made available to our farmers.

In pursuance of the effort to acquire all information relating to work done elsewhere along this line, a letter was addressed to Hon. W. E. Meehan, Commissioner of Fisheries of Pennsylvania, who, we understood, has entered upon the work of breeding frogs for public distribution. His reply indicates a public interest in this new departure in pisciculture — perhaps it may more properly be called frog culture — that is most encouraging. Mr. Meehan writes in part as follows: —

If you had had the experience I did this summer, when public announcement was made that applications would be received for frogs hatched by the State, you would be even more thoroughly convinced that it was a matter of more than passing interest. There were about 300,000 frogs hatched, and the blank applications filled out called for nearly 2,000,000. In addition, there were several hundred letters received after the last blank form had been sent out. There was not a nook or corner of the State from which applications were not received. The experiment has convinced me that the Department of Fisheries of Pennsylvania must hereafter go into frog culture on more extensive lines than brook trout, and if possible on lines as extensively as we do in some of our food fishes, namely, shad and whitefish. The frogs we raised last summer were from wild spawn. . . .

Mr. Meehan hopes to soon issue a bulletin giving the facts relating to frog culture as prosecuted by the Pennsylvania

Commission; but at the time of writing, Nov. 9, 1904, he had not secured sufficient data to justify the issuance of such a publication. This was due to the fact that "the work . . . was only begun on a large scale last spring," and there had not been time to collect data.

The press very properly gave wide mention of this work, and to that extent aided in an effort which ultimately may take high rank; since the prosecution of frog culture on a large scale may contribute materially to the profitable utilization of heretofore waste areas, and a consequent increased income to our agricultural population.

The fullest utilization of all water resources for the production of food is, we believe, a justifiable ambition of this commission, especially if important results can be accomplished with comparatively small outlays. For this reason, experiments may soon be made by us to test the feasibility of breeding frogs on a large scale in this State; but it is evident that such work cannot be accomplished on a plan of sufficient magnitude with the facilities now at our command. And frog culture, which now seems far simpler than fish culture was at the beginning, is only a suggestion of the yet undeveloped possibilities that await the progressive fish culturist in the immediate future.

The Work of Distribution. — The work and method of distribution have been so fully considered in previous reports that little remains to be said here, beyond the statement that the work has now been reduced to a system that nearly eliminates serious mistakes and trouble, with the result that satisfaction with what is accomplished is very general. We know of only one important exception to this. This was due to misleading statements made to the messenger who carried the fish, with the consequent result that, although they were intended for Packard Pond in Orange, they went into another pond. Almost as a matter of course there were attempts to get trout to put into private brooks, — attempts such as were usually successful years ago, — but they were defeated; there were also numerous other small annoyances, but they were overcome by the messengers, and may be considered unimportant.

In view of the great number of brooks, rivers and ponds stocked (there were 195 applications for stocking brooks with

trout fry and 205 for brook trout fingerlings, 8 ponds have been restocked, 23 applications for stocking ponds were filed), and the fact that the messenger may necessarily have to go to unfamiliar localities, and may have his plain instructions to applicants misunderstood, or even may also occasionally have to deal with open attempts to defraud the State, — it speaks well for the efficiency, the intelligence and faithfulness of those engaged in it, that it has been prosecuted so effectively with a minimum of error. It is true that some of our best men, those most experienced in the service, have been detailed to this work; but the highest intelligence may not always be proof against plausible, misleading statements, especially when fish are liable to die if action is deferred even for a comparatively short time.

A large list of extracts from letters, etc., warmly commending what the commission has accomplished in fish distribution, which might be supplied, is omitted for the sake of brevity, since they would be only supplementary to or a repetition of what already have been published in previous reports. The only complaint was regarding the small number of fingerlings. We sincerely regret there were not more; but it always will be impossible to meet the demands with our present facilities, nor can we deny fingerlings to one that another may get a larger number. Fair play and no special favors must control the distribution.

It is gratifying to be able to state that the withdrawal of several of our experienced men from the law-enforcing work to carry on the fall distribution of fish was not so seriously felt this year as it was in 1903, for the reason that available financial resources were sufficient to allow the appointment of temporary salaried deputies to take part in the enforcement of the fish and game laws.

Work at the Hatcheries. — Reports from all sections of the State indicate a satisfactory increase in the number of trout and other game fish, and the evidence of “good strings” taken in the State are becoming numerous.

The most certain results follow stocking with fingerlings. The proper demand for fingerlings exceeds many times the capacity of our rearing ponds, and increased facilities must be

furnished for rearing a greater number of trout and salmon fry to fingerlings, if the commission is to meet the reasonable demands which come from all sections of the State. The advantages of such an increased output are obvious, not alone from the point of view of the true sportsman and the lover of nature. The actual economic value of the fish produced makes this a matter of interest to all who see the advantage of causing our brooks and rivers to be a definite source of food or even pecuniary income, as well as a resort for pleasure and recreation. The public demand for fingerling trout is an intelligent one, and should elicit a satisfactory response.

The usual spring output of fry from our hatcheries included 915,550 brook trout and 40,000 brown trout. The largest number of fry of these species that could be accommodated and all of the rainbow trout and landlocked salmon were reserved to be reared to fingerlings. In the fall, 41,000 brook trout fingerlings were liberated in the brooks; 11,000 brown trout fingerlings, 7,000 rainbow trout fingerlings and 1,200 landlocked salmon fingerlings were put into ponds; also 337 adult brook trout have been liberated in ponds; while 4,000 brook trout and 2,000 brown trout fingerlings have been held at the hatcheries, to replenish or add to the brood stock.

From the foregoing it will be seen that the aggregate output of eggs, fry and larger fish was considerably in excess of 26,000,000; and, having in mind the number of fingerling and larger fish included in this summation, and their comparative potentiality for stocking purposes, the result seems satisfactory. The increase over last year exceeds 73 per cent.; the total output was nearly thirty times as much as it was five years previously.

In addition to our ordinary work, we undertook to aid those desirous of obtaining carp for stocking purposes. We were able to do this from the ample supply in the pond at Winchester. The expense was paid by those desirous of securing the carp for private waters.

The latest report of the Illinois Fish Commission not only emphasizes the paramount value of the carp as a basis for an important commercial fishery, — more important than all other species combined, — but it points out the fact that it is a fine

game fish, and therefore deserves the appreciative consideration of the sportsman angler as well as that of the fisherman who catches it for profit.

The report of the superintendent of the Sutton hatchery follows : —

STATE FISH HATCHERY,
WILKINSONVILLE, MASS., Dec. 12, 1904.

To the Commissioners on Fisheries and Game, State House, Boston, Mass.

GENTLEMEN : — The collection of brook trout eggs in 1903 amounted to 628,000 ; of brown trout, 40,000 ; making a total of 668,000. Later, this number was increased by 85,000 rainbow trout eggs received from the Hadley hatchery and the United States Fisheries Bureau Station, Manchester, Ia. ; but the latter lot, numbering 25,000, was almost entirely spoiled in transit, and only about 2,000 fry were hatched from it.

From three female salmon, part of a small experimental lot raised from the stock hatched here in 1899, 5,000 salmon eggs were secured. The eggs were of large size, well colored, and apparently as strong as wild salmon. One lot was well fertilized, but the other two were rather poorly fertilized because of lack of males at spawning time. The fry resulting from these eggs were somewhat reduced by an epidemic in May, but at all other times were healthy, and seemed proof against disease or parasites. The fry hatched from the brown trout and rainbow trout eggs were received for rearing, and yielded satisfactory results, although the rainbow trout fingerlings were smaller than common, because of the lateness of the eggs — three months later than usual — in hatching. Early in June an epidemic attacked the rainbow trout kept in the lower tubs, and destroyed about 8,000. It was supposed that this trouble would be avoided this year, because it was no longer necessary to use pond water ; but it is probable that the spring water piped from the head of the pond deteriorated in its passage through the pipe, for fish of the same lot kept in the same water at the head of the pond were not affected. Early in September the rainbow trout in the plank pen by the hatchery were attacked by fungus, and 1,000 died. These pens are supplied by pond water, and it is an exceptional year when the fish are carried through without loss.

Twenty-three thousand brown trout, rainbow trout and salmon were raised to fingerling size, and were sent out in October and November for stocking ponds ; 100,000 brook trout eggs were shipped to Winchester, and 500,000 fry were hatched from the eggs left. Fry numbering 331,000 were put out in the spring distribution, and 161,000 were reserved for rearing, which number was later increased by 15,000

fry received from Hadley, making a total of 185,000 for rearing. The brook trout equalled in size the exceptionally large ones grown last year, and filled the ponds nearly as well as the larger number some years before, though some pools, especially those below the hatchery, were not nearly filled to their capacity. In all of these pools there was an unusual shrinkage, and in one, possibly two, both excavated in soft, black soil, there was a possible loss by leakage through mole holes. Trouble from moles at this place has been met with many times before, and it would add largely to the yield of these ponds if they could be planked, and also prove an important measure of economy in the care of them. Some of the upper pools have shallow margins, and the fish are exposed to losses that might be avoided if the pools could be deepened around the shores, and plank used for edging. The results from the upper plank pool are a yearly object lesson of the advantage to be expected from this improvement, for this pool is uniformly the most productive of all, and it possesses no advantages over the others except in its construction.

The number of fingerling brook trout raised was 45,000, and several thousand of these were reserved for rearing as breeders.

No especially new problems in the care of the fish arose during the year, but many matters previously mentioned, and recommendations made, may be repeated, some with more urgency, as with the lapse of time the need becomes plainer. The improvements mentioned in the ponds, for the protection of the fish and as a means of probable increase, would make it possible to shade and enclose the ponds with netting more effectively. For some ponds, where the need of this is most urgent, it is quite impracticable to do anything as the ponds are now. These small improvements cost but little in any case, and, in the aggregate for all that is needed, add but a slight percentage of increase to a year's expense; but would add materially to the capacity of each pond, to which we must look for an increased supply of fingerlings.

The pond next above the brood fish pond, which is generally used for yearlings, was filled with rainbow trout, and when these were shipped was used for holding spawned trout. This pond is partly walled with stone, and only a supply of cement is needed to finish the work, as an abundance of stone lies near the pond. This work and the suggested work of paving the bottom with flagstones, grouted with cement, to make it possible to keep the spawn in better condition, is particularly urgent, for every year sees a heavy loss of the female trout that sometimes cuts seriously into the supply of brood fish. The benefit of shading, which is also pronounced in the case of ponds, is possibly as needful for the tubs where they are set in

open ground; for there has been a pronounced difference in the condition of the fish grown in the tubs, those set in the woods producing healthier and better fish than those exposed to the sun. When this became apparent, covers were made for the tubs at the new stand, and a quick improvement resulted. A still more effective way would be to build awnings of wood or canvas over the tub stands.

The old pipe to the hatchery having become clogged and nearly useless, a new one was laid to a point near the hatchery beyond which the old pipe was serviceable. From the springs a deep cut was made across to the pond, and a four-inch vitrified tile pipe laid, coming out on the bank about six feet above the water level in the pond, so that ample fall was secured for utilizing the surplus water in a stand of tubs. The tile pipe terminated in a large iron tank set in cement, and from this a two-inch galvanized-iron pipe was laid nearly three hundred feet to the hatchery. The old pipe, if taken up and cleaned, could be relaid and used for supplying the lower tubs. The tubs formerly located in the woods and supplied by the same water were moved to the new location, where they could be supplied through the four-inch tile pipe, and placed on a solidly built stand. More stone wall was laid at the upper pond, but the work could not be brought to an end, because it did not seem advisable to lay stone without cement. The overflow from the brook was taken care of by digging a ditch around this pond, and thus it was made safe for use as a rearing pond for fry. Above the upper ponds, between the plank pen and the woods, a tract of rough ground was filled in and levelled by flowing the water of the brook over it while work was being done in cleaning out and deepening the channel. The mud and sand carried down by the water graded the ground very evenly.

Below the dam unused plank pens were torn out, and the lumber used in building a new pen near the meat house, where it would be useful in holding fish for spawning, when the pond was drained, and as a rearing pond for yearlings.

The usual amount of work was done in clearing land of stumps and otherwise improving the grounds, but this was done mainly with reference to the needs of hares and pheasants.

The arrangements for hatching pike perch were improved by adding a new form of supply tubs, that regulated the flow of water in the pens so well as to stop the bunching of the eggs and consequent loss; and fry were cared for better by the construction of a large receiving tank, used in place of the glass aquaria.

Early in May 5,000,000 pike perch eggs were secured from the United States Fish Hatchery, Swanton, Vt., and by careful transportation reached the hatchery in excellent condition. Many im-

provements made in the hatching apparatus, the result of observation made during the visit to Swanton to secure the eggs, and suggestions of the foreman at that station, made it possible to handle the eggs much better; and resulted in a very successful hatch,—nearly 3,500,000 fry. While the arrangements for hatching had been so improved that the eggs can be handled without unusual loss, the low temperature of the water used in hatching affects the quality of the fry, and makes the results of stocking uncertain. The hatching period is lengthened fully one-half, and the fry is developed in water that is probably 10° to 12° colder than the water of their natural spawning grounds. It might be expected that this would result in feeble fry, and, while there has been no opportunity to make comparisons with normally healthy fish, the quality of some lots has been decidedly inferior to what was expected.

In hatching pike perch, the gain over nature's methods is almost wholly in fertilizing and developing the eggs; but from the time of hatching it is doubtful if any care that can be given will improve on a home in natural spawning waters. Where millions of fry are hatched they must be crowded together in masses, that in the case of such fish as trout, whose capabilities are better known, would be regarded as impossible, and in the case of the perch must be considered harmful to quite a degree. In natural spawning waters the fry would be under conditions wholly favorable for gaining strength, and its minute size would make it exempt from the dangers that attend the larger fry of trout and salmon.

It seems probable that better results might be obtained if the pike perch eggs were taken when well eyed and scattered on what would approximate the natural spawning beds of the fish. In shallow water, with a steadily rising temperature, they would hatch quickly and gain strength rapidly, and the dangers to which they might be exposed could hardly equal the dangers of hatching in jars and of transportation.

In addition to what has been recommended, many other improvements are desired, and some should be pointed out as deserving early attention. A refrigerator should be built, as proper means of keeping the fish food never existed here; and this food spoils very quickly, even if it reaches the hatchery in good condition, which is often not the case. The loss of food has never been large, but the indirect loss from feeding spoiled meat and the waste of time in handling it must be considerable.

The road entering the grounds has for many years received but little attention, and is for a part of the way merely a cart path, having no ditches and obstructed by partly sunken boulders. The travel

is sufficient to justify a well-built road. Where the road crosses the dam the plank forming the facing of the dam toward the pond is very rotten, and should be replaced.

The condition of the water in the breeding pond, which this season was bad, seems to indicate that the ponds and inflowing streams are used to their full capacity, and any extension in that direction is not likely to result in any gain in production, as with the addition of any new pond there is likely to be a corresponding loss in capacity of the older ponds, especially of the brood pond; but two of the lower group of springs, flowing in below the dam, are not yet utilized, and, though located where it is quite difficult to make ponds, if the means could be provided to do the work, three ponds of about the average capacity could be built. The three ponds with three already built in the same locality would make a block of six, fed by unfailing springs, and not affecting or being affected by any of the others. This location is also favorable for development in other ways, as it is the most promising place for driving wells, which may provide a much-needed increase of water. The improvements recommended, and many not mentioned but deserving early attention, require to execute them an amount of work greatly in excess of what has been possible to accomplish in past years with the allotted means. While no season here has passed without making good progress in putting the hatchery in the most productive condition, what is accomplished falls each year farther behind the requirements, because of the constant increase of routine work and greater amount of repair needed, both of which will demand additional attention in the future, leaving even less time for new work.

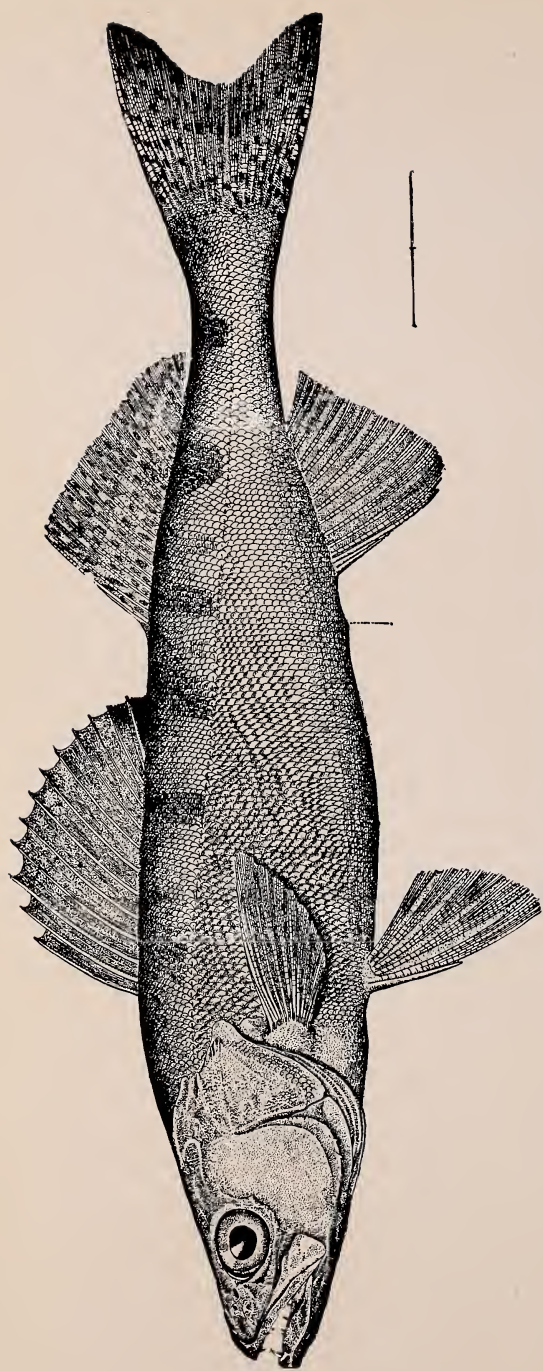
The demands upon the hatchery have been such that its greatest capacity should have been reached several years ago, yet, at the rate which has been possible to develop it, this end may be several years in the future.

It should be possible to execute some of this needed work either by increasing the allotment for regular work, or by making a special allotment for some of the more pressing matters, so that the largest output can be secured, while the urgent demand for it is so far from being satisfied.

Respectfully submitted,

ARTHUR MERRILL,
Superintendent Sutton Station.

The usual routine work of hatching fry and sending the young fish out from the hatcheries at Winchester and Adams has been performed in the ordinary manner. There has been no occasion for improving these stations, and nothing seems



STIZOSTEDION VITREUM. — Pike Perch or Wall-eyed Pike.

feasible beyond keeping them in repair. It has been previously stated that they are solely what are usually termed developing stations, — auxiliary hatcheries, made necessary by the former system of distribution of fry, through which each applicant had to go to a station for his allotment of fish, and transport them thence at his own expense to the point where they were to be planted. For this reason the public demanded the establishment of stations so located as to give them reasonable access to the hatcheries, so that their personal expenses in the item of fish distribution would be somewhat less of an annual burden. Under present conditions there would be no reasonable excuse for the expenditure of money for such auxiliary stations, however much we may now need an additional first-class hatchery; but, inasmuch as they have been constructed in the most durable manner, it is apparently more economical to use them than to let them lie idle, since the transportation of fish eggs costs far less than the expense attending the movement of fry. There is consequently a saving to the State in utilizing the hatcheries already provided at Adams and Winchester, so far as fry are concerned, since the outlay for superintending the hatching is nominal.

The work done and improvements made at Sutton and Hadley are detailed in the reports of the superintendents of those stations. It is only necessary to say here that everything practicable has been done at the Sutton station to improve and utilize its natural resources. The introduction of new pipes for the carriage of water to the hatchery, tubs, etc., was among the important improvements of the year. Little or nothing in the way of permanent improvement has been attempted at Hadley. There is, apparently, no justification for special effort or outlay in this direction. The willows planted around the ponds for shade have grown well; in a short time they will be large enough to provide much protection to the trout in warm weather.

A change of superintendents at the Hadley station, due to the unexpected resignation of Supt. W. D. Tripp and the appointment of W. R. Collins, led to some differences in management which are believed to be advantageous.

The following report of Mr. Collins, superintendent of the

Hadley station, gives details of the work prosecuted at that hatchery : —

I was appointed as superintendent at the Hadley hatchery on March 16, in place of Mr. William D. Tripp, who resigned, and left here on the 16th. Previous to this time I had been for two weeks at the station as assistant, and had thus gained some knowledge of the status of affairs at the hatchery before assuming responsible control of it.

From such information as I was able to glean, the condition of the work at the beginning of the year was as follows : —

There were on hand 429 adult brook trout; 1,100 young brook trout, which became yearlings in the spring; 127 four-year-old brown trout; 339 adult rainbow trout; and 78 four-year-old landlocked salmon.

The adult brook trout and the salmon were in the large pond, the yearling brook trout in section pool No. 4 and the larger pool next to the pond, the brown trout in the wooden pens below the dam, and the rainbow in sections Nos. 1, 2 and 3. There were also 492 rainbow trout fingerlings, which were put into the wooden pens below the dam last winter. The adult rainbows were transferred to the large pond as soon as we got all the eggs from them, the last of which were not taken until March 29, owing to the extreme cold of the winter, which delayed ovarian development.

During the spawning season of 1903-04, up to and including March 14, 1904, there were 241,500 eggs taken at the hatchery, and after this time we got 77,000 rainbow eggs, making a total of 318,500 eggs for the season.

The eggs were divided as follows: 153,000 brook trout, 60,000 brown trout and 105,500 rainbow trout.

During the process of incubation and hatching there were lost a total of 30,071 as eggs or young fry, or not quite 10 per cent.

Of the rainbow trout eggs taken, 75,000 were sent to the Sutton hatchery after they had eyed out. The balance of the fry were all in a healthy condition on April 15, and, barring the small losses caused from what appeared to be inflammation of the gills, and from other causes commonly encountered in the work, we had on hand at that time a fine lot of large fry for distribution.

On April 20 we commenced the annual work of distribution, all the fry being sent out under charge of Deputy Dennis F. Shea. Brooks were stocked in various towns of this section of the State, and from all to whom the fry were consigned Mr. Shea brought back the most favorable reports of their appreciation of the fish. The oldest brook trout fry had attained a really extraordinary size at the time of dis-

tribution, and caused considerable surprise as well as satisfaction to those who received them. The other fry were all of good size, and were none the less in favor with the recipients.

The favorable reports that came in from all quarters, concerning the size and condition of the fry at the time of distribution, goes to prove that this is without a doubt a fine station for raising fry; but the lamentable deficiency of water still prevents us doing anything further towards trying to raise fry to the fingerling stage.

After the season of distribution was over we put out into the four section pools at the upper end of the grounds 40,000 fry, viz., 10,000 brook trout in each of the pools Nos. 1 and 3, 10,000 brown trout in pool No. 2 and 10,000 rainbow trout in pool No. 4.

Before we placed the fry in the pools we made some floats of laths and put them at the head of the pools, to give shade to the young fish. They seemed to enjoy hiding under these floats, and also under the shade of the young willow trees which were planted last year along the edges of the pools. These willows have thrived well, and bid fair to furnish a lot of shade to the fish that are in the pools in the summer months.

After the fry were placed in the pools they were looked after very closely, and coaxed until I could get them to bunch up instead of scattering all over the pool at the time of feeding. They received their regular three meals daily, and at the usual hours, with rare exception. Still, with all the care bestowed upon them, the fish began to drop off gradually, and every day I could see quite a number of dead fry floating on the water. The loss was probably greater than I realized, and no doubt numbers of the fish were hidden by the masses of vegetation in the pools; for when we came to seine out the fingerlings, we found only a total of 760 out of 40,000 fry. These were divided as follows: 462 brook trout, 162 brown trout and 136 rainbow trout.

This alarming mortality among the young fish goes far toward discouraging any future attempt to raise fingerlings here. What the cause of this decimation is has not yet been determined, so far as I am aware.

In May we were favored with a visit from Mr. Jocelyn, a specialist who makes a study of fish diseases, and who while here made microscopical examinations of some of the young fry in the hatching house.

Shortly after the distribution of fry, Commissioner Delano paid a visit to the hatchery, when we made a change in the location of some of the fish.

We drew off the largest one of the six pools at the head of the

pond, and cleaned out the mud and refuse. Then we seined the pools holding the yearling brook trout, and transferred them to the large pool. We then drew down the section pools and cleaned out the disagreeable black mud, sticks, etc., after which we put on a coating of clean sand about four or five inches deep. This gave the pools a clean, bright appearance, and put them in much better condition to receive the young fish which we put out, as heretofore mentioned.

We had 127 large brown trout which had wintered in the wooden pens below the dam. Thinking they were in rather close quarters for fish of their size, I transferred them to the pool between the sections and the pond. They seem to have enjoyed the change, and have no doubt done better than in their former quarters.

During the spring and summer we were caused considerable annoyance from fish-eating birds and other natural enemies of the fish. In the early summer I saw quite a number of fishhawks and herons in the neighborhood of the ponds, but they were so wary that it was hard work to get a shot at them. As the summer advanced these large birds grew scarce, but there were plenty of those little pests, the kingfishers, present at all times; they ate great numbers of the young fry. Superintendent Merrill of the Sutton hatchery paid me a visit the first of May, and recommended the use of pole traps, in the same manner that he used them last summer. I made the experiment, and found it to be very profitable, for by the use of the traps in this way I caught a number of birds; I took 13 kingfishers, 3 bitterns and 1 great blue heron. This latter bird was a very fine specimen, measuring, when shot, 5 feet 7 inches from tip to tip of the spread wings; he had been a serious menace to our fish.

During the summer I received visits from a few scientific gentlemen, who were naturally interested in the work because of its scientific value. I did what I could to explain the different phases of the work, and, while imparting some knowledge of local conditions to them, I gained from them some information which will, I trust, prove valuable to the station. The hatchery appears to be interesting and instructive to the average citizen in this section of the State. Generally on pleasant Sunday afternoons during the summer from 10 to 30 people would come from different points to visit the station, often for the special purpose of seeing the fish fed. Many came two or three times, and in this way, as well as by their words, showed their appreciation of the work the State is doing in this direction.

I furnished specimens to Mt. Holyoke College once, for use in their zoölogy classes. They had at that time 1 two-year-old brook trout, 100 trout fry and 50 eyed eggs.

W. RAYMOND COLLINS,

Superintendent Hadley Station.

List of Ponds stocked. — Thirty great ponds of the State have been stocked with food fish suitable to the varying conditions in the ponds, but all were desirable varieties for game or food; and regulations controlling fisheries for three years have been applied, in conformity to the provisions of section 19, chapter 91 of the Revised Laws. Such regulations were, however, omitted in cases where a pond was restocked that had been stocked within three years, and similar provisions of control had already been applied to it.

Sixteen of the ponds were stocked for the first time, or were restocked upon petition, in accordance with law, for the second time. Of the latter there were 5, — an increasing number, which is evidence of the growing popularity of the law making possible a continuance of the conservative regulations applied, and the resultant continuance of a reasonable supply of fish, instead of the waters being practically barren of fish life.

Following are the names and location of ponds stocked for the first time, and the species of fish put into them: Massapoag Lake, Sharon, pike perch; Long Pond and Little Long Pond, Plymouth, were stocked with pike perch and brown trout; Packard Pond, Athol, landlocked salmon; Goose Pond, Chatham, Baker's Pond, Orleans, and Great Herring Pond, Plymouth, were stocked with brown trout; Billington Sea, Plymouth, Quannapowitt Lake, Wakefield, Baddacook Pond, Groton, and Sheep Pond, Brewster, were stocked with rainbow trout.

The following were stocked for the second time, and the fishing therein reregulated, under section 19, chapter 91 of the Revised Laws: Long Pond, Tewksbury, and Pleasant Pond, Wenham, were stocked with pike perch; Long Pond, Freetown, with brown trout; Great Pond, North Andover, and Forest Lake, Palmer, were stocked with rainbow trout.

The following ponds, with regulations of which were in force at the time, were restocked in accordance with the policy of the commission to do all possible to increase the abundance of fish in so-called closed ponds: Forest Lake, Palmer, pike perch and adult brook trout; Round Pond, Palmer, pike perch; Massapoag Lake, Groton, pike perch and landlocked smelt; Spectacle Pond, Littleton, brown trout,

pike perch and landlocked smelt; Fort Pond, Littleton, pike perch; Quabbin Lake, Greenwich, brown trout, pike perch and landlocked smelt; North Pond, Orange, pike perch; Cranberry Pond, Spencer, landlocked smelt; Laurel Lake, Lee, brown trout and landlocked smelt; Lake Chaubunagungamaug, Webster, adult trout; Neck Pond, Barnstable, landlocked smelt; White Pond, Concord, Hampton Pond, Westfield, and Pearl Lake, Wrentham, brown trout; and Rock Pond, Georgetown, landlocked smelt eggs.

In addition to the above, Hoosicwhisick Pond in the Blue Hill reservation and Lake Quinsigamond in Worcester were both stocked, but not closed, making a total of 32 ponds stocked.

Uniform regulations have been applied. These regulations prohibit, for three years from date of issuance, "all fishing from the first of November to the first of June of each year. Fishing is permitted with single hook and hand line, or line (with single hook) attached to a rod or pole held in the hand, on Monday, Wednesday and Saturday of each week, from the first day of June to the first day of November of each year, while the regulations are in force." A penalty of \$20 for violation of these regulations has been fixed by the commissioners, in accordance with law.

What Ponds shall be stocked? — The petitions filed, demanding the stocking of ponds which had been assigned for the water supply of towns and cities, and the attempts made by some of the water boards to control or prohibit fishing in such ponds, through certain regulations promulgated by themselves or by boards of health, raised anew the question of the constitutional rights of the people in the matter of fishing or enjoying other public rights in great ponds of the State on the one hand, and the powers of water boards under various acts of the Legislature on the other, — a question that is troublesome to the public and to this commission, and which ought to be authoritatively settled.

It is true that the late Hosea M. Knowlton, while holding the position of Attorney-General of the Commonwealth, when considering a question of the public rights in a pond assigned by statute as a water supply of a town, declared that: "It is well settled that the statute authorizing the town to take Cape

Pond does not take away any public rights in said pond, excepting so far as they are necessarily lost in the exercise of the right conferred upon the town to use the waters of the pond as a source of water supply. The right of fishing remains unimpaired, as well as all other public rights, subject to the limitations I have stated."

The same distinguished authority also gave it as his opinion that "the town has no right to obstruct the passage of fish, unless it can show that the waters of the pond are thereby rendered unsuitable for drinking purposes." If this is a correct interpretation of public rights, then it follows that towns and cities, or any agency thereof, have no legal right to prohibit or control fishing in great ponds of the State that are used for a water supply, unless it can be clearly shown that fishing makes the waters fished in "unsuitable for drinking purposes." And "the burden of showing this fact is upon the town," according to the authority quoted.

It is regrettable that the opinion given by Mr. Knowlton fails to indicate whether or not it is the duty of the State to take legal proceedings against municipalities which have seemingly invaded public rights by alleged prohibition of or attempts at control of fishing in ponds stocked by the Commonwealth, without showing clearly to this commission that such action was necessary to preserve the purity of the water "for drinking purposes." In consequence of this omission, and the general assumption that the State should make an issue of this matter, the commission has been besought to act in various directions, especially in the matter of stocking water supply ponds, with the evident hope on the part of some that a contest in the courts for the determination of the respective authority of the State and the municipalities in the right to control fishing under the various water supply acts of the Legislature may be precipitated. Such a contest would necessarily be costly and troublesome, and might be the cause of friction between those desirous of being at peace with each other and extending to each other every courtesy that good will can prompt. For these reasons, anything in the nature of a conflict of authority, which would make a resort to the courts necessary on the part of any one, would be greatly deplored.

Meantime, the situation is clearly embarrassing. The law (section 19, chapter 91, Revised Laws) is mandatory regarding the stocking of ponds. It provides that, when a petition has been properly presented, requesting that "a great pond" be stocked, "the commissioners . . . *shall* cause the waters of such pond to be stocked with such food fish," etc.; and "they *shall* thereupon prescribe . . . regulations relative to the fishing in such ponds and their tributaries. . . ."

If, then, a great pond of the State continues to be such, so far as fishing is concerned, after it is legally assigned as a water supply, then it is evidently the duty of the commission to comply with the mandate of the law when a request to stock it is presented in due and proper form; and *it is clearly the duty and right of the commission to "prescribe . . . regulations relative to the fishing" therein.* There can be no question about this, and for this reason it is difficult to see how a regrettable conflict of authority can be avoided *if we comply with the law*, and some other agency *with equal authority of law* attempts to do what the law commands us to perform.

It is therefore evident that the Legislature should take action that will settle this question. It should declare either that the assignment of a pond as a water supply takes away from the people no right of fishing or other public right, so long as fishing, sailing, etc., is pursued in a manner that does not cause pollution of the water; or else it should clearly state that a water supply pond is not a great pond of the State, so far as public rights are concerned, and when assigned for such a purpose is thereafter to be the property of a corporation, to be controlled by the water board of the town or city it supplies, and the public have no constitutional rights therein.

The acts of water boards in prohibiting fishing, boating, shooting, etc., on certain ponds, seem to have been taken on the presumption that it was the intent of the Legislature, in making assignments for water supply, to absolutely take away from the public all rights they had theretofore enjoyed, and to which they are still entitled, if the opinion of the late eminent Attorney-General Knowlton is of any value. In view of this, and because it is evidently unwise to put fish into a pond from which the public are or may be excluded, it seems highly

important that this matter should be definitely settled by legislation. Meantime, we have deemed the matter of sufficient importance to request the Attorney-General to furnish us with an opinion on the chief points at issue, in order that we may be able to carry on our work with a full knowledge of public rights in the ponds (or lack of them), and also with an authorized definition of our responsibility and authority under the law. It is also desirable that the limitations upon water boards should be clearly and authoritatively established.

While it may be conceded that the preservation of the purity of drinking water is of practically paramount importance, there is serious question if public rights should be recklessly invaded, on the pretext of securing this. The fullest possible proof should be submitted to proper authority that no other means can be found to accomplish needful results; and, at least, this commission should be relieved from the responsibility of stocking water supply ponds over which it cannot exercise control of fishing. Either this or the right to use great ponds of the State for a water supply should be abandoned. At any rate, the present embarrassing and unnecessary condition should not longer exist.

The following exhaustive opinion of the Attorney-General throws a clear light upon the status of water supply ponds, and shows beyond question that the assignment of a pond for water supply by the Legislature immediately changes the status of a great pond of the State. It therefore appears that it is thereafter impracticable for this commission to completely carry out the mandates of section 19, chapter 91 of the Revised Laws. This being the case, it seems wiser — indeed, imperative — that we shall not hereafter attempt to stock ponds that are used for water supply purposes, since it is evident that we cannot exercise control over them, and the rights of fishery are subordinate to those for which a pond has been assigned.

DECISION OF THE ATTORNEY-GENERAL.

OFFICE OF THE ATTORNEY-GENERAL,
BOSTON, Nov. 25, 1904.

JOSEPH W. COLLINS, Esq., *Chairman, Department of Fisheries and Game.*

DEAR SIR: — You have required my opinion upon the effect which certain rules and regulations made by the State Board of Health,

under Revised Laws, chapter 75, section 113, may have upon the duty of the Fish and Game Commission, under the provisions of Revised Laws, chapter 91, section 19.

Revised Laws, chapter 75, section 112, is as follows : —

The state board of health shall have the general oversight and care of all inland waters and of all streams and ponds used by any city, town or public institution or by any water or ice company in this commonwealth as sources of water supply, and of all springs, streams and water courses tributary thereto. It shall be provided with maps, plans and documents suitable for such purposes, and shall keep records of all its transactions relative thereto.

Section 113 reads : —

Said board may cause examinations of such waters to be made to ascertain their purity and fitness for domestic use or their liability to impair the interests of the public or of persons lawfully using them or to imperil the public health. It may make rules and regulations to prevent the pollution and to secure the sanitary protection of all such waters as are used as sources of water supply.

Revised Laws, chapter 91, section 19, provides that : —

The commissioners, upon the petition of the mayor and aldermen of a city or of the selectmen of a town within which a great pond or a portion thereof is situated, or of thirty or more inhabitants thereof, shall cause the waters of such pond to be stocked with such food fish as they judge to be best suited to such waters. They shall thereupon prescribe, for a period not exceeding three years, such reasonable regulations relative to the fishing in such ponds and their tributaries, with such penalties, not exceeding twenty dollars for one offence, as they deem to be for the public interest, and shall cause such regulations to be enforced. Five hundred dollars shall be annually appropriated by the commonwealth to carry out the provisions of this section.

This section was amended by Statutes of 1903, chapter 274, which authorized the commission to restock such ponds with food fish.

The facts submitted in your communication are applicable to North Watuppa Pond and its tributaries, which is used by the city of Fall River as a source of water supply.

Acting under the authority of Revised Laws, chapter 75, section 113, the State Board of Health has made certain rules and regulations governing North Watuppa Pond and its tributaries, of which only section 14 is material to the present question.

14. No person shall bathe in, and no person shall, unless permitted by a special regulation or by a written permit of the Watuppa water board of the city of Fall River, fish in, or send, drive or put any animal into North

Watuppa Pond, so called, said pond being in the city of Fall River and the town of Westport, and used by said city as a source of water supply. No person other than a member of said Watuppa water board, its officers, agents or employees, or public officers whose duties may so require, shall, unless so permitted by regulation or permit of said board, enter or go, in any boat, skiff, raft or other contrivance, on or upon the water of said pond, nor shall enter or go upon, or drive any animal upon, the ice of said pond.

Your letter also states that the board of health for the city of Fall River has also established rules and regulations relating to North Watuppa Pond, in substance like those above quoted; but, inasmuch as it is the clear intendment of Revised Laws, chapter 75, sections 112 to 130, to place the entire regulation of sources of water supply within the sole jurisdiction of the State Board of Health, I do not regard the local regulations referred to as material upon the matter of your inquiry. It is true that local boards may still control and abate nuisances which may be found within their jurisdiction, and upon or adjacent to great ponds, whether or not such ponds are used as sources of water supply (see *Stone v. Heath*, 179 Mass. 388); but there is no statutory authority for the establishment by them of any permanent rules or regulations relating to sources of water supply. Such regulations, therefore, can have no effect upon the duties of the fish and game commission.

The power of the State Board of Health to make rules and regulations is conferred in order "to prevent" the pollution and "to secure" the sanitary protection of great ponds which are used as sources of water supply. This is a police regulation, and, in so far as such rules and regulations are necessary for the preservation of the purity of the water, they will take precedence of general statutes regulating the rights of the public in great ponds. The fact that a great pond has been taken as a source of water supply, however, does not in and of itself necessarily deprive the public of the right of fishing, or, indeed, of any other right which may be exercised without interfering with the use of the pond as a source of water supply (see *Rockport v. Webster*, 174 Mass. 385; Opinion of Attorney-General, Dec. 6, 1900; Attorney-General's report, 1900, page 111).

It must be assumed, therefore, that the rules and regulations made by the State Board of Health, under authority of Revised Laws, chapter 75, section 113, were based upon some finding or adjudication by such Board that the use by the public of the waters so regulated, for boating, fishing or taking ice, is or is likely to become a source of pollution, and an injury to the water taken therefrom for the purposes of water supply, in which case the rules and regulations are authorized, and are binding upon the public.

It remains to consider the effect of this rule or regulation upon Revised Laws, chapter 91, section 19. This statute is mandatory, and imposes a duty upon the Fish and Game Commissioners to stock the waters of a great pond whenever a petition of the prescribed character is addressed to them; yet, if the requirement of the section is absolute, it would follow, in the case of North Watuppa Pond, that upon petition they would be required to stock such pond without the authority to use a boat, if a boat were necessary, in distributing the fish; and the petitioners would not be permitted to derive any benefit therefrom unless the permission of the Watuppa Water Board of the city of Fall River was obtained. Moreover, it is within the bounds of possibility that at any time the State Board of Health may absolutely forbid fishing and boating, and thus render the operation of stocking such pond not only useless to the public, but conceivably injurious to the waters of the pond as a source of water supply.

In view of these contradictions, it seems to me impossible to hold that any duty under Revised Laws, chapter 91, section 19, rests upon the Fish and Game Commission to stock a pond used as a source of water supply, and upon the public enjoyment of which, rules and regulations of the State Board of Health similar to those under consideration have been imposed. In other words, a great pond which is set apart as a source of water supply is, in a measure, withdrawn from the status of a great pond, and all public rights attaching thereto are subordinated to the single use to which the Legislature has devoted it. It is true that to a limited extent other public rights therein may be still exercised; but the jurisdiction of the Fish and Game Commission is so seriously affected, that, in my opinion, the mandatory language of section 19 would not be applicable; and the commission must be permitted to use its discretion in determining whether or not, in consideration of the existing rules and regulations of the State Board of Health, it is advisable or proper to comply with a petition for stocking such a great pond.

Very truly yours,

HERBERT PARKER,
Attorney-General.

In view of this decision by the Attorney-General, it is announced that this commission will decline to stock a great pond which is being used as a source of water supply.

Attention may justly be called to the petitions that have been filed, asking for the stocking of private ponds, that are gravely declared to be "great ponds of the State" by the petitioners. Whether this is done through ignorance, or with the

intent of fraudulently acquiring something from the State, we are unable to say; but there have been cases in which the ponds were so clearly *not* great ponds of the State, that it is difficult to have a high conception of the intelligence or the honesty of purpose behind the effort to get them stocked free of cost. So large a percentage of the applications have been for private ponds, that the commission has found it necessary to defer stocking any pond until it has had opportunity to examine it, or at least to satisfy itself that it is, naturally, a great pond of the State, and entitled to consideration as such. We cannot undertake to put fish into any waters where there is question of public rights being disturbed by private or corporate authority, unless the law compels such action.

Rivers stocked.—Taunton Great River was stocked with more than 3,000,000 shad, that number having been put into Assowompsett Lake and its tributaries, which are head waters and natural spawning grounds of this river. The head waters of Parker River—Crane Pond—were stocked with exceeding 3,000,000 of shad fry. This is the first time this river has been stocked with this species; but the Taunton Great River was stocked two years ago with shad, and it is reasonable to assume that we shall shortly learn of adult fish of this species appearing in the spring run in increasing numbers.

Examination of Ponds.—The work of examining ponds, in order to secure sufficient data to enable us to stock them intelligently, was continued as usual. The presentation of petitions alleging that certain private ponds are great ponds of the State, and urging us to stock them, is, as stated elsewhere, an additional reason why ponds should be examined before any fish are put into them by the State.

Twenty-two ponds have been visited, and examinations were made in every case where a boat was available, and the ponds were sufficiently large to justify official consideration of this kind. In one case it was quickly seen that three ponds at Attleborough were not only small, but artificial as well; one pond that was examined at Sandwich, because the claim was urged that it was a great pond of the State, was subsequently found to be artificial; and three ponds in the Blue Hill reservation of the metropolitan park system were visited, and such

examinations were made as seemed necessary to determine their leading characteristics, and thus to enable us to decide what species of fish ought to be put into them. In five years 91 ponds have been examined sufficiently to determine (1) if they are great ponds of the State, and (2) to acquire sufficient knowledge of them otherwise to enable us to stock them intelligently. In all, more than 100 ponds have been visited.

Following are notes relating to ponds visited in 1904:—

Massapoag Lake, Sharon: This is a fine, oval-shaped pond, of considerable size, the banks being wooded in some places, while in other sections there are cleared farms or lawns. Around the lake are numerous fine cottages and one hotel, also a large icehouse. Another icehouse which has been located on the edge of the pond was burned shortly before the visit of the commission. The principal species of fish are red and white perch, black bass, pickerel, catfish, shiners and roach or sunfish. The bottom is soft black mud over large areas, and generally in the deeper sections, in which, however, patches of clean bottom sand or gravel are found. At the time of examination, on May 23, 1904, there was no indication of much vegetation in the water, such as pickerel grass and lilies. It is probable that pickerel grass is abundant in midsummer, and that a few lilies may grow along the edges of the pond. The temperatures taken indicated that there are springs at the bottom of the pond, since the temperature in some places is much lower than it is in others at the same depth. We were told that there are bars across one end, and that in low stages of water in midsummer parts of them are dry. The temperatures obtained were as follows: air, 80° F.; surface, 64°; depth of 12 feet, 64°; 17 feet and 20 feet, 62°; 30 feet, 61°; 36 feet, 60°; 39 feet, 56°; 42 feet, 58°.

Upper Shawme Pond, Sandwich: This pond was examined on June 20. A careful examination, supplemented by inquiry, developed the fact that it is wholly an artificial pond. Thus, although it is now of considerable size, it must be classed as a private pond.

Long Pond, Plymouth: This is a beautiful pond, about a mile and a half long and from one-fourth to two-thirds of a mile or more wide, the width varying considerably, owing to

coves or bays along the sides of the pond. The shores of this pond are generally bold and wooded, although not remarkably high at any point. The shores are sandy as a rule, but with cobblestones, pebbles and gravel mixed with sand in many places. The shores fall off steeply, with clear, sandy and gravel bottom, and depths ranging from 25 to 35 feet not far from the land. One brook enters the pond. There are several fine summer houses along the shores of the pond, and others which are less pretentious. These residences are embowered in trees as a rule, though in some cases there are cleared fields. The principal species of fish are white and red perch, small-mouth black bass, which are scarce. There are a few pickerel. We were told that there were no bullheads or catfish, and no sunfish or shiners, but an abundance of minnows. The pond has the greatest depth of any yet examined by this commission, and a range of temperature that makes it suitable for any species of game fish. The following temperatures were obtained on June 21: surface, 70° F.; at depths of 18 and 25 feet, 68°; 30 feet, 59°; 61 feet, 54°; 82 feet, 58°. The temperature at the bottom apparently fluctuates considerably, to such a degree that, as indicated above, a temperature may be obtained in one place that is much lower than it is in another, even though the depth is greater at the latter point. This pond is reputed to have a depth of over 100 feet, and no doubt the claim is true. On the occasion when it was examined, however, a threatened squall prevented a careful search for the deepest water; but the depth and temperatures obtained were of a nature that did not require further research for the purposes of this commission.

Great South Pond, Plymouth: This is a large and nearly circular pond, which has been taken as a water supply for the town of Plymouth. The principal species of fish are black bass, pickerel, white and red perch, catfish and eels. Shores and bottom are sandy. There is a brook which connects Boot and Great South ponds, and another between Little South and Great South. About twenty cottages are around this pond, the shores of which are considerably varied, being low in some places and hilly in others, but generally wooded. There are no pond lilies except in some of the coves. The bottom is

generally clean, but there is more or less silt. The temperatures obtained on June 21 were as follows: surface, 70° F.; at a depth of 25 feet, 68°; at 48 feet, which was the maximum depth obtained, temperatures of 60°, 65° and 66° were found.

Ponkapog Pond; Blue Hill reservation, Milton: This is a large, shallow pond, about three-fourths of which is within the metropolitan park system at Blue Hill. It has well-wooded, low shores, and in places grassy shallows, barely out of water, which are covered with a dense growth of reeds, etc. It was visited on July 12, but no boat being available, it was not practicable to examine it. The following data, however, were obtained from Hon. E. P. Whitney of the Board of Metropolitan Park Commissioners. The pond has a soft, muddy bottom for the most part, but in some small areas there are stones and gravel. It also has abundant aquatic vegetation. The depth does not exceed 10 feet in any place at the highest stages of water, and generally will not be over 8 feet, while a large part of the pond has a depth that would not exceed 6 feet. The pond is noted for having large pickerel and some yellow perch and black bass, although the latter species is not numerous. It is probable that the temperatures in midsummer would range from 75° F. to 80°.

Turtle Pond, metropolitan park reservation, Hyde Park: This is a small, shallow pond, that was formerly known as Mud Pond, but is of considerable local value for fishing. It is resorted to by those who care to catch pickerel, perch, etc. The pond was visited on July 12, but inasmuch as there was no boat available, it was not examined. We learn, however, that it does not exceed 10 feet in depth, and has a muddy bottom, with pond lilies and other aquatic vegetation. It is probable that the temperature of the water in midsummer is not below 70° F., or 75° at the lowest.

Hoosicwhisick Pond, Blue Hill reservation, Milton: This is a fine pond of 50 or 60 acres, on the metropolitan park reservation at Blue Hill, and in general has low or sloping banks, which are well wooded, and as a rule rise gradually from the water. The shores are stony, pebbly and gravelly as a rule, but in places there are stretches of sand beach. One brook flows into the pond, and there is a small outlet which some-

times dries up in summer. The principal species of fish are pickerel, pout or catfish, small yellow perch, sunfish and shiners, but the species chiefly sought by anglers are not abundant. The bottom in the deeper part of the pond is soft, black mud, but there appear to be patches of cleaner bottom near the edges: and there is little or no aquatic growth, such as pond lilies and other aquatic grasses. When the pond was examined, on July 12, the following temperatures were obtained: surface, 80° F.; at a depth of 18 feet, 66°; 22 feet, 62°; 26 feet, 52°; 40 feet, 56°. The bottom temperatures indicate the presence of springs in places.

Sheep Pond, Brewster: This is a large, natural pond, being about one and one-half miles long by one-quarter to one-half of a mile in width. For the most part the banks rise in steep hills and bluffs, some of which are well wooded with scrub oaks: but the majority of the bluffs are bare, and are simply steep, sandy hills, rising abruptly from the shore. The beaches are sandy, as a rule. There is very little aquatic vegetation. There is only one cottage near the pond. This pond is evidently deep; presumably it may have a depth of more than 100 feet, with probably sandy and gravelly bottom. It is evidently fed by springs, and presumably the temperature in the deepest portions is low. The principal species of fish are black bass, pickerel, white and yellow perch, sunfish and shiners. At the time this pond was examined, on July 28, the surface temperature was 76° F. There was no proper opportunity to examine the pond, owing to the fact that no boat other than a tiny skiff was available, and she was so small that it was dangerous to attempt an examination in the stiff breeze that prevailed. However, one sounding was made in 40 feet, where a temperature of 74° was secured: but, owing to the risk, the thermometer was down only a few seconds, and it is probable that it did not show the exact temperature of the water.

Baker's Pond, Orleans: This is a pond of considerable size, with densely wooded banks all around it, but no cottages very near. There are, however, some shooting blinds. The pond has the appearance of being fed by springs. The shores are sandy, and it is probable that the bottom is also sandy. It

has the appearance of being deep in the centre. There are a few lily pads in the shallow coves. The shores for the most part rise more or less steeply, but are low and marshy in spots. The pond was visited July 28, but no boat being available, it was impracticable to make a careful examination of it.

Goose Pond, Chatham : This is a natural pond of approximately 150 acres, with generally steep, wooded shores ; but in places there are bare, sandy bluffs, rising abruptly from the beach, and in a few places the shores are low and boggy. The beaches are sandy as a rule, and presumably the bottom is the same. The bottom falls off steeply into deep water. No brooks empty into the pond, and it is evidently fed by springs. There is very little aquatic vegetation, but there are a few reeds and other aquatic grasses in shallow places near the shore. There are no camps or cottages around this pond. The principal species of fish are pickerel, yellow perch, catfish, sunfish and shiners. A careful examination of the pond could not be made, because no boat was available.

Deantown Pond, Farmer's and Mechanic's Pond, Attleborough : These ponds were visited by the late chairman on July 21, and sufficient examination was made to determine the fact that they are all flowed ponds, and are entirely artificial. They are all small and shallow, with depths probably ranging from 4 to 8 feet. The dams are from 8 to 10 feet high. The ponds were evidently originally flowed for milling purposes. The commission has on file a petition for stocking these ponds, but, inasmuch as the State has clearly no jurisdiction over them, no action of this kind could be taken.

Crystal Lake, Haverhill : This is a pond of considerable size, which was naturally a great pond of the State, but has been apparently flowed somewhat to increase its acreage, for the purpose of serving as a water supply for the city of Haverhill. In the eastern section the water is shallow and warm, with muddy, grass-covered bottom as a rule, though in some places there are patches of stone, pebbles and gravel. Here there are many lily pads. The water is deepest in the western section, and is reputed to be 70 feet deep in one spot. As a rule the bottom in this section is soft black mud, without grass ; but there are small patches of hard bottom, and some aquatic plants, such as lily pads and pickerel grass, near the

shores or in coves where the water is comparatively shallow. The shores of the pond are generally stony or pebbly, but there are patches of gravel. The banks rise gently from the water, and are well wooded. In places where there are tall trees the banks have the appearance of being steep. There are a number of cottages around the pond, but not much attempt has been made to clear places about them. In spring and fall there are two small brooks that empty into the pond, but these are dried up in summer. There is also a small outlet when the pond is high. The principal species of fish are pickerel, yellow perch, catfish, sunfish, eels and shiners. On July 22, when the pond was examined, the following temperatures were obtained: surface, 80° F.; at a depth of 8 feet, 79°; 10 feet, 78°; 12 feet, 63°; 38 feet, 52°; 40 feet, 59°; 46 feet, 56°; 48 feet, 55°. The last-mentioned depth was the maximum depth obtained. It is evident, from the variation in temperatures, that the pond is largely or wholly fed by springs.

Great Pond, North Andover: This is a fine pond of considerable size, that is used for a water supply. It is clear of aquatic vegetation to a large degree, if not entirely. The banks of the pond as a rule rise gently. There are some cleared areas, but for the most part the banks are well wooded down to the water, even where there are camps or summer houses, of which there are many. The bottom is chiefly soft black mud where the pond is deepest, but there are patches of stones and gravel, the hard bottom, however, being more in evidence near the shores than elsewhere. The beaches are mostly stony and gravelly. The principal species of fish are white and red perch, black bass, pickerel, pout or catfish and sunfish. It is said that before the pond was stocked with black bass, of which there are both the small-mouth and the large-mouth variety, shiners were abundant, but that now they are scarce. White perch are reputed to be large and abundant, and bass are also stated to be plentiful. On August 9, when the examination was made, the following temperatures were obtained: surface, 77° F.; in depth of 13 feet, 74°; 26 feet, 66°; 30 feet, 65°; 29½ feet, 62°; 28 feet, 63°; 32 feet, 61°; 33 feet, 65°. The fluctuations in temperature indicate the presence of springs at the bottom of the pond.

Pearl Lake, Wrentham: Pearl Lake, or Whiting Pond, in

Wrentham, is naturally a great pond of the State, but its area has been somewhat enlarged by flowage, caused by the building of a dam 3 to 5 feet high at the outlet of the pond. The shores are generally stony, pebbly and gravelly, and the banks rise more or less gently, although in some places there are steep bluffs. At other points there are short stretches of low, marshy shore. The banks are mostly well wooded, but there are cleared areas of greater or less extent. The lake is a favorite summer resort, where people go to enjoy picnics, etc., as well as to spend the summer months. There are many cottages and camps around the lake, some of which are rather pretentious. In the middle of the pond are two small islands, on each of which is a cottage. There are inlets, some of which are more or less shrunk or dry in summer, and an outlet caused by the overflow at the dam. The bottom is extremely variable. Patches of hard gravel or stones and soft mud alternate at short distances. There is some pickerel grass on the bottom, but very few lily pads except in some of the shallow coves. The chief species of fish are red and white perch, pickerel, black bass, so-called "lake trout" (which are brown trout, with which the lake was stocked recently), pout or catfish, which are reputed to be plentiful, suckers, sunfish and shiners. The following temperatures were obtained on August 11, on which date the lake was examined: surface, 74° F.; depth of 8 feet, 73°; 15 feet, 67°; 28 feet, 54°; 22 feet, 62°; 20 feet, 70°; 32 feet, 58°; 29 feet, 59°. The fluctuations in temperature indicate springs on the bottom of the lake.

Archers Pond, Wrentham: This is a fine, attractive pond, situated close to Wrentham Lake, and a tributary to the latter. For nine or ten months of the year a small brook runs from Archers Pond to Wrentham Lake, but in midsummer, when the water shrinks considerably through evaporation, there is only a small trickling rivulet (caused chiefly by seepage) that suggests connection between the two ponds. Archers Pond is a favorite summer resort for the people of the Attleboroughs and other contiguous manufacturing towns; is in general wooded, with gently rising banks. At one end of the pond there is a settlement and considerable cleared land, but generally speaking the cottages or camps are built close to the

water's edge, and apparently an effort has been made not to disturb the foliage of the place. The water is very clear, with practically no apparent vegetation. It is reputed to have a depth of 70 feet, but this is doubtful. The principal species of fish are the red and white perch, black bass, pickerel, sunfish and pout. The following temperatures were obtained on August 11, at which time the examination was made: surface, 76° F.; depth of 30 feet, 64°; 33 feet, 59°.

Baddacook Pond, Groton: This is a natural pond of considerable size, and is held in reserve for a water supply for the town of Groton. As a matter of fact, the water supply of the town is obtained from a large well close alongside of the pond, and the water of the latter is not now used. There is no dam or other artificial means of raising the water, so far as was seen. The pond has one inlet and one outlet, but is apparently largely fed by springs. The banks are divided between low, reedy stretches of shore, and coarse rocks, pebbles or gravel. The banks as a rule rise more or less gradually, in some places rather steeply. They are about equally divided between wooded areas and cleared spaces. There are four farmhouses near the pond, also two summer cottages and a pumping station. Aquatic grasses and lily pads are found in a few places in the shallow coves, but as a rule are not much in evidence. The bottom is generally soft black mud, but an occasional spot of hard bottom was found. There is a bar across the southwest end of the pond, where there are only 2 or 3 feet of water, but in other places the depth was fully up to the average for ponds of this class. The principal species of fish are pickerel, yellow perch, pout or catfish, sunfish, chiven and shiners, and it is said that fish are generally not abundant. On September 6 the following temperatures were secured: surface, 73° F.; depth of 29½ feet, 64°; 20 feet, 60°; 35 feet, 55°; 40 feet, 58°; 42 feet, 54°.

Crystal Lake, Gardner: This is a natural pond, about one and one-half miles long and one-half mile wide. It is situated in West Gardner, and is a beautiful and attractive feature of the locality. It is the source of water supply of the town, which is reputed to have a population of about 12,000. It is a favorite resort for boating, and is also utilized to some extent

for fishing. We were informed that boating and fishing on this pond have always been permitted, despite the fact that it is used as a water supply. There is a cemetery located on the village end of one side of the lake; on the opposite side is a club house and at the south end a pumping station, but there are no summer cottages, since the village is so near that there seems no occasion for these. The shores rise gently, but in some places to a considerable height. They are partly wooded, and on the unsettled portion of the banks bordering the pond the land is about equally divided between wooded and cleared sections. The pond is very clean and exceptionally free from lily pads and other aquatic grasses, although these may occur to a slight extent in the more shallow sections. Pickerel grass was found in depths of 10 to 15 feet. The shores are generally rocky, but the bottom is chiefly soft mud with few hard spots. There are two little inlets or tiny brooks which are dry in midsummer. The principal species of fish are pickerel, black bass, pout or catfish, yellow perch, sunfish and shiners. At the time of examination, on September 8, the following temperatures were obtained: surface, 68° F.; depth of 16 feet, 66°; 28 feet, 66°; 32 feet, 60°. The maximum depth obtained was 32 feet.

Lake Quannapowitt, Wakefield: This is a large, natural pond, which, like Crystal Lake in Gardner, is so near the thickly settled portion of Wakefield that it is a much-frequented resort of the residents for boating and fishing. It is a reserve source of water supply for the town, but we are informed that it is not used for such a purpose at the present time, and fishing and boating have never been interfered with. Generally speaking, the banks of the pond are rather low, or at least they do not rise to any considerable height. They are about equally divided between clearings and wooded sections, or at least sections where there are a number of fine shade trees. There are many houses around the lake, which is practically in the settled section of Wakefield; on one side, however, there is a cemetery. Much of the shore is rocky, naturally or artificially, but the bottom is apparently covered by soft mud. It is reputed to have one spot in which there is a depth of 15 to 20 feet, but there is doubt of the existence

of such a place, as many soundings were taken without any indication of a greater depth than 10 feet. Pickerel grass and other aquatic grasses were common on the bottom, but no weeds or lily pads were seen at the surface, although such may occur on the surface in isolated shallow spots. The principal species of fish are white and yellow perch, big and small mouth black bass, pickerel, carp, pout, eels, sunfish and shiners. Formerly it was a spawning ground for alewives. As might readily be assumed, the water is warm. The following temperatures were obtained on September 12, when it was examined: surface, 70° F.; depth of 8 feet, 70°; 10 feet, 68°.

Packard Pond, Orange: This is a natural great pond of the State, but is comparatively small in size, perhaps not exceeding 30 or 40 acres in extent. Its acreage has been slightly increased by flowage, but not materially, due to the fact that the pond is situated in an amphitheatre of hills, and is what some of the local people designate as a "sink hole." As a natural consequence it has steep sides, and the bottom falls off abruptly to a depth of 20 to 30 feet close to the shore. The shores are gravel, and, so far as soundings were taken, indicated that the bottom is hard and generally of this gravelly nature. There are two or three camps located near the pond, the banks of which are generally well wooded. There is a single inlet and one outlet. At the time the pond was examined, on September 22, the water was low, being down to about a point where it was before it was flowed. When it is at the maximum it is about 15 feet higher. The pond is reputed to have a depth of 45 to 50 feet when high, and this is probably a correct estimate. Packard Pond is remarkable for being exceedingly clean, so far as vegetable matter is concerned. The principal species of fish are yellow perch, pickerel, pout and sunfish. There are said to be no shiners and very few catfish. The following temperatures were obtained: * surface, 60° F.; at a depth of 25 feet, 48°; 30 feet, 46°.

Pottapaug Pond, Dana: This is a natural pond of fair size. The east branch of Swift River empties into it and leaves it

* At the time the examination was made there had been two or three days of cold weather for the season, and the air temperature at the time was down to 52°, which probably influenced the surface temperature of the pond to some extent.

as an outlet, but the flow is almost imperceptible, as a rule. There are, besides, two good-sized brooks and one small brook that empty into it. The shores are low in places and gently rising in others, and they are partially wooded, mostly with young growth. There is one farmhouse near the pond, and one cottage or camp. This is a markedly shallow pond, the depth not exceeding 9 feet in any place, so far as the examination demonstrated, and a good many soundings were taken. The depth for the most part ranges from 4 to 7 feet. The bottom is soft mud, but the pond is reputed to have hard bottom near the shore in one or two places. Examination, however, did not disclose anything of this kind. Pickerel grass or other aquatic grasses are abundant all over it, and there is a considerable quantity of lily pads in the shallowest sections. The principal species of fish are yellow perch, pickerel, catfish, eels and shiners; sunfish and suckers are also found, but not in abundance. The pond was examined on September 23, which was the third of a series of cold days, during which the temperature of the air had been down to freezing, and at the time the examination was made was 52° . The temperature of the surface of the pond was 60° F., and at a depth of 9 feet, 57° .

According to the report of the United States Fish Commission for the year ending June 30, 1903, several of our State ponds were examined by Mr. Vinal N. Edwards of the Woods Hole station, in November, 1902. Inasmuch as the data gathered by Mr. Edwards supply the information we want, we venture to compile from the published notes such facts as we require. In doing this, it is proper to remark that the surface temperature of the ponds at the time they were examined by Mr. Edwards was undoubtedly several degrees lower than it would be in summer, but we apprehend that the bottom temperature had changed little, if any; it probably remains substantially the same throughout the year.

Neck Pond, Barnstable: area, 50 acres; extreme depth, 35 feet; 24 feet deep at 100 feet from shore. Gravelly bottom to depth of 25 feet; beyond that depth bottom sandy and covered with grass, very thick in places. Little animal life in grass. Caught yellow perch and minnows near shore in seine. " Other fish found in deeper parts of the pond are brook trout,

black bass, several kinds of small fish and landlocked salmon. . . . When fishing for a few minutes in the middle of the pond with salt water shrimp, two salmon were caught and two others were brought to the surface; then, the shrimp being expended and minnows being used, only large yellow perch were caught. It is reported that every one who has fished for perch with shrimp bait has taken some salmon." The temperatures obtained November 10 were "46° F. at surface, 44° at bottom."

Michaels Pond, Barnstable: area, 25 acres; depth, 30 feet; temperature November 11, 53° F. at surface and bottom. Shores gravelly, bottom hard, covered with grass; no shade; water not so clear as in other ponds; no outlets or inlets; water cannot be drawn off. Pond contains an abundance of yellow perch, horned pout and minnows. Seven years ago 5,000 rainbow trout were planted, but none has since been seen.

Grigsons Pond, Barnstable: length, one and one-quarter miles; width, three-fourths to one mile; half the pond is 80 feet deep, the deep water close to shore; temperature November 10, 54° F. at surface, 52° F. at bottom; summer temperature said to reach 70°. Little shade; very clear; sides gravelly to depth of 30 feet, beyond that mostly hard bottom covered with grass; no outlets or inlets; water cannot be drawn off. Black bass, pickerel and yellow perch abundant; a few brook trout said to occur.

Mortality of Fish in Ponds. — Recently there has been much complaint of mortality of fish in ponds, especially in late spring and early summer. Press accounts have appeared of fish dying in ponds, of dead fish floating on the surface of lakes or being found in numbers along the shores of inland waters, where they soon became a nuisance unless they were quickly disposed of. Of course such mortality threatened large depletion of fish life in the interior waters, and a consequent diminution of the opportunities for sport or the obtainment of food. Under the circumstances, it is not remarkable that many of those interested in fishing, and naturally apprehensive of the result of such an apparent epidemic, should appeal to the commission for information as to the cause of the mortality, and likewise for a remedy, if obtainable.

Realizing the importance of the matter, both from an economic

and scientific point of view, measures were taken as promptly as possible * to make inquiries regarding it. Dr. George W. Field, then biologist of the commission, was sent to the western part of the State to examine into the cause of complaints which had come from that direction. Much of the trouble had then passed, but he was able to discover one supposed cause of the fatality.

After careful and extended search, three fish were found in Pontoosuc Lake still showing a slight evidence of life, but lying belly up on the bottom of the pond. Examination of these showed a great number of larval cestode worms in the body cavity, in the walls of the stomach and in the liver. These worms appear to have been migrating from the stomach into the tissues, and may have been in such numbers as to cause the death of the fish in the same manner as the migration of trichinæ causes death in man in cases of trichinosis. There is no danger to be feared from eating fish infested by these cestodes, since it is not probable that they would live and develop in the human stomach and tissues.

It is possible that these parasitic worms may have been the cause of much of the mortality last spring in Pontoosuc and Onota lakes' and Cheshire reservoir. These waters were examined by our biologist, who reported that the mortality was not due to the use of dynamite, poison and pollution of the water, or to spawning, but possibly to this cestode, about which little or nothing is known, and least of all a remedy for dealing with the difficulty.

It has been evident, however, that there is more than one cause for the mortality which has been so much in evidence, last year and this, in ponds and rivers of this State. Lack of reasonable supply of oxygen in the water has been one prolific cause of death to fishes. Dr. Field referred to this in his "Preliminary report upon the cause of death of alewives in Mystic River and the Lower Mystic Lake, during May and June, 1903." These notes were published in our last report,

* No action could be taken to incur the expense incident to an investigation of this matter until the money was available to pay for the outlays. Inasmuch, therefore, as the final appropriation was not made until the last day of the legislative session,—it became a law June 9, 1904,—it was not possible to investigate this question of fish mortality as early as otherwise would have been practicable.

and the causes assigned for the conditions can be found therein.

Meantime, the attention of the commission has been invited to another cause of mortality to fish life in our fresh waters, viz., an excessive growth of certain forms of algæ, their death and decay, and consequent diminution of oxygen in the water. It seems entirely reasonable that a superabundance of algal matter may account in large part for much destruction of fish life that would be scarcely explainable upon any other hypothesis. Experiments of purifying water by the addition of copper sulphate, carried on by Dr. Charles Harrington at Massapoag Lake, Sharon, the results of which are now under observation by the State Board of Health and by the biologist of this commission, are as yet incomplete. The conclusions may be discussed in a subsequent report.

Fishways.—The amendment of section 9, chapter 91 of the Revised Laws, by chapter 365, Acts of 1904, was a long step in advance for the preservation of our native fishes or introduced species, the continued abundance of which depends upon the establishment of fishways or fish ladders to enable the fish to pass to the head waters of streams for the purpose of spawning. The law as it now stands on the statute books is as follows:—

The commissioners may examine all dams upon rivers where the law requires fishways to be maintained, or where in their judgment fishways are needed, and they shall determine whether the fishways, if any, are suitable and sufficient for the passage of the fish in such rivers, or whether in their judgment a fishway is needed for the passage of fish over any dam; and shall prescribe by an order in writing what changes or repairs, if any, shall be made therein, and where, how and when a new fishway must be built, and at what times the same shall be kept open, and shall give notice to the owners of the dams accordingly. The supreme judicial court, or the superior court, shall, upon the petition of the commissioners, have jurisdiction in equity or otherwise to enforce any order made in accordance with the provisions of this section, and to restrain any violation of such order.

The hope was cherished that much might be accomplished this year in the establishment of new fishways. The demands in other directions, however, and the lack of funds to permit the

commissioners to travel as much as usual, combined to prevent as much activity along this line as was hoped and expected. No serious harm is expected to result from the delay, since, with few exceptions, the most important points where fishways are needed are on the rivers which have been stocked with shad; and, as the latter will not attain maturity and return to the waters where they were planted until they are three or four years old, it is anticipated there will be ample time to provide means for them to reach the head waters of the streams when the impulse of procreation compels them to seek the spawning grounds in our rivers.

Necessary measures have been taken in other cases, either to secure the building of a fishway or the repairing of others. In one case it is feared the matter will have to be settled in the courts.

Much needs to be done in the way of building fishways, but there is reason for anticipating that the near future may see satisfactory conditions along this line that were not possible of attainment until the revision of the law.

We have been urged to cause the construction of fishways on the Neponset River, on the ground that action was to be taken to purify the water of that stream. Without considering the question that much time may be required for the waters of a stream so seriously polluted as the Neponset has been to become anything like pure, even if the continuance of pollution is suspended, inquiry developed the fact that nothing of importance has yet been done to check the pollution of the river. Under these circumstances, it naturally follows that we will do nothing in the direction of causing fishways to be built there. It would be reprehensible folly to compel the erection of fishways in a stream in the waters of which a fish cannot live.

In our last report reference was made to the unsatisfactory location of the fishway at Lawrence. It now appears that even the passage of lampreys is probably interfered with by the sewer at the foot of the fishway.

Under date of July 18, 1904, Mr. Thomas S. Holmes writes: "I was able to get only 70 lampreys this season, and I wanted over 200 to supply the demand." Mr. Holmes is superintend-

ent of the fishway, and has been for years. He has usually collected more or less lampreys for laboratory purposes and for investigations of scientific problems, having had our permission to do this for the colleges and universities. Ordinarily he has been able to easily collect all that were required. He makes no comment on his failure to do so this year, but, while there may have been other contributing causes that led to a scarcity, the mere statement of fact reported by Mr. Holmes is apparently sufficient evidence of the unwisdom of putting the foot of a fishway in immediate juxtaposition to the outlet of a city sewer.

Prevention of Stream Pollution by Sawdust. — A serious and determined effort has been made to complete this year the work of prohibiting stream pollution, so far as that can be accomplished under section 8, chapter 91, Revised Laws. The work done along this line in 1903 was felt to be practically the limit of accomplishment in this direction. It is therefore occasion for gratification that it has been considerably exceeded the current year, and in consequence has been brought substantially to a termination. It is possible that there may be a water-driven sawmill here and there which has not been visited and the discharge of sawdust from it prohibited, but it is certain such are rare, if existent. We believe the evil is eradicated.

It is particularly gratifying that, of the large number of owners of mills thus enjoined from the discharge of sawdust into streams, a large majority have, we believe, found means to dispose of the dust, either with a profit to themselves or at least so that they suffer no loss by complying with the law. Meantime, the fish-supporting potentiality of the streams is materially enhanced, and an important natural resource of the State is thus made an asset of increasing value.

Orders prohibiting the discharge of sawdust have been sent to the following mill owners in 1904: Theron Cole, Frederic Ward and Perkins & Ward, North Carver; P. J. Holmes, Carver; Washburn & Soule and Josiah Marshall, Middleborough; Wheeler Bros., Monroe; John Whitely and Joseph Holden, Shirley; David Shores, Pelham; Dennis Cadwick, Shutesbury; C. W. Brewer and H. D. & Frank Sisson, New

Marlborough; Philip Porter, Rochester; Andrew Kemp, Pepperell; G. A. Proctor, Townsend harbor; the Noble Milling Company, Springfield; Charles Hyde, Southbridge; Harry Evans, Warwick; John A. Carter, Petersham; Frank A. Germain, Charlton; H. M. Parsons and C. N. Loud & Co., Westhampton; Thomas Welcome, Bernardston; William E. Reed, Rowe, Franklin County; Nathaniel K. Angus and Austin Thompson, Halifax; Daniel Ware, Ashby; Nathaniel Cushing, West Wareham; Kenney & Morse, South Wareham.

Orders have been sent to mill owners as follows: 1900, to 15; 1901, to 24; 1902, to 24; 1903, to 27; and 1904, to 30. The aggregate is 120, and, inasmuch as one order often applies to more than one mill, it can readily be seen that the work performed was not a small one, especially as the application of this law (section 8, chapter 91, Revised Laws) involves visiting many remote and out-of-the-way places, which can be reached only by the expenditure of much effort.

In one or two cases the orders were temporarily suspended, for good and sufficient reasons, but the limit of all such suspensions has expired.

Pollution by Acids. — Complaints have come to us of the pollution of ponds or streams by acids or other deleterious substances discharged from manufactories, and earnest and insistent appeals have been made for relief from such conditions. While it is not difficult to understand that there is occasion for protests and appeals of this nature, it is well for the public to understand that we have no authority to correct the evils of which they complain. The State Board of Health may be able to deal with such matters, if the conditions complained of are deleterious to health or a menace thereto, but we can do nothing.

Pond and Brook Fishing. — The reports which come to us from various sources and from all parts of the State indicate fishing conditions in this Commonwealth at the present time superior to any that were deemed possible only a comparatively short time ago. For a State so thickly populated as Massachusetts, and one in which the pollution of interior waters is now only partially stopped, — prevented only so far as sawdust is concerned, — there is satisfaction at least in feel-

ing that the efforts of the commission have produced results which might be creditable in a region less thickly settled and whose manufacturing was less extensively prosecuted. We have knowledge, through the press or otherwise, of catches of fish, especially of brook trout, that would have been satisfactory in New Hampshire, Maine or Vermont. The late chairman knew of a catch of upwards of 30 brook trout, one of which weighed $2\frac{1}{4}$ pounds, all taken in a brief time from a brook in the central part of the State, and he personally participated in the pleasure of eating some of them.

Extracts from the press, reports of deputies, etc., on file at the office, convey a rather comprehensive idea of fishing conditions in various sections of the State, and indicate very satisfactory and progressive improvement.

BIRDS AND MAMMALS.

Game Birds. — It is the opinion of ornithologists that only by very special efforts can the supply of quail in Massachusetts be maintained, on account of climatic conditions. It is the desire of this commission to co-operate to the fullest possible extent with the several game protective associations of the State and with individuals in all attempts which promise to increase the numbers of game birds and animals. These efforts should be directed towards:—

1. The naturalization of quail about farm buildings, where they can be most readily cared for during inclement weather.

2. The reservation of suitable covers. It often happens that the desire to “clean up” farms, with the attendant cutting of hedge rows and underbrush, is most prejudicial to quail. To the writer’s personal knowledge the cutting of the underbrush on one tract of not over two acres was responsible during one summer for the destruction of the eggs in three quails’ nests, and the killing of two of these quails by the family cat.

3. The reservation of clumps of bayberry, sumac, “black alder” (*Ilex verticellata*), red cedar, and other bushes bearing fruit which persists during the winter and is not likely to be buried by the snow.

4. The reservation of crowded bunches of cedars, pines, hem-

locks and other evergreen trees, as covers where birds may find shelter from heavy snows.

5. Care in avoiding the starting of forest fires. Many fires are undoubtedly to be traced to the carelessness of hunters.

It is a pleasure to know from personal contact that many true sportsmen have abstained from shooting quail during the hunting season just passed. A closed season on both quail and ruffed grouse for a term of several years would make for the advantage of the birds, and thus benefit the farmer and the sportsman, unless artificial propagation can be established in several sections on an adequate scale.

In the belief that it is of great importance to save the few quail which remain after the severe winter of 1903-04 and the heavy snowfall of December, 1904, the commission issued the following circular letter to its paid deputies:—

BOSTON, MASS., Dec. 27, 1904. •

DEAR SIR:—Permit me to call your attention to the importance of using every effort to bring through the winter as many quail as possible.

It is within the duties of the paid deputies of this commission to engage actively in this problem, whenever and wherever it does not interfere with special detail work.

You are, therefore, hereby directed and empowered to purchase cracked corn, barley, wheat, barn chaff or available grains, when in your judgment conditions warrant, and distribute this in the covers. Shovel away snow where necessary. When possible, make the distributions daily in reasonable quantities, say a quart or two scattered, and so disposed as to be of value to quail, rather than to mice, squirrels, crows and jays. This gives an opportunity for individual thought, ingenuity and judgment.

Make careful observations upon the number of quail seen, the number of tracks of quail, partridge, fox and skunk which have visited the feeding place or immediate vicinity.

Include in your daily narrative reports the record of these observations.

Yours very truly,

GEORGE W. FIELD.

In general, the purchase of grain is limited to one bushel, and is only to be distributed when the snow or ice renders the food supply precarious. In response to personal requests, notices have been sent to several unpaid deputies, requesting

them to look after certain definitely located flocks of quail, and provide suitable food when in their judgment it seemed advisable.

The notable work of the fish and game protective associations deserves the interest and support of all loyal citizens. Without the activity of these associations, supplemented by many public-spirited citizens, in purchasing and liberating quail, this bird, which is well-nigh the most beneficial feathered friend to the farmer, might have long ago disappeared from within our State. With the alarming decrease in the number of quail in the States south and west of us, and the continued adoption of laws prohibiting the transportation of game beyond the borders of these States, the opportunities to purchase live birds are becoming limited. To many it is evident that the necessity of propagating our own supply of quail is even now upon us. Under suitable conditions, the birds can be propagated in Massachusetts at less cost than is involved in the purchase and transportation of live birds from other States.

As indicative of the great value of the work done by the game protective associations, we print the following letter from the Massachusetts Association : —

MASSACHUSETTS FISH AND GAME PROTECTIVE ASSOCIATION,
216 WASHINGTON STREET, BOSTON, Feb. 7, 1905.

Dr. GEORGE W. FIELD, *Chairman, Massachusetts Fish and Game Commission, State House, Boston, Mass.*

DEAR SIR : — In response to your request for a statement regarding the work of acclimatization performed in 1904 by the Massachusetts Fish and Game Protective Association, I beg to say that 183 dozen live quail were purchased by this organization, at an expense of \$3,000, and were liberated in fifty different localities.

Generous contributions for this purpose were received from many public-spirited citizens, as well as from several sportsmen's clubs in different sections of the State. Reports received from persons who liberated the birds, and which were rendered in the autumn, furnish conclusive evidence that in the great majority of the consignments the birds bred and thrived surprisingly well. In two or three cases the quail were not found after their release, which, to my mind, indicates that they either fell a prey to natural enemies, or flew away to other localities — probably not many miles — in search of food.

Respectfully yours,

HENRY H. KIMBALL,

Secretary.

Appearances indicate that conditions have been favorable to the increase of ruffed grouse during the past year. No actual data are available as to number of ruffed grouse, quail and woodcock killed in the State each year. Such data, if obtainable, would be of great value in determining the efficiency of certain laws, *e.g.*, the "no-sale" law, closed seasons, etc. There are obvious difficulties in securing correct voluntary reports from individuals, but by co-operation of gunners and other interested persons with the deputies of this commission and with various organizations much information of value which might approximate to a census of our game bird population might be furnished. Some information of this nature has been obtained in certain States; *e.g.*, in Pennsylvania 10,000 ruffed grouse were killed in 1903 and in 1904 13,000 on a territory but twenty miles in diameter.

In the absence of any exact figures upon which even tentative computations can be made, the majority of the written and verbal opinions which have come to us indicate a considerable increase in the number of ruffed grouse, but a smaller number of woodcock, upland plover, Carolina doves and wood ducks. Our annual report of 1903, pages 148-159, refers to the presence of the wild pigeon in Massachusetts. The species was probably the Carolina dove, and not the passenger pigeon. The passenger pigeon has not been reported in the State since 1889, while our other native species of wild pigeon, the Carolina dove, is rapidly becoming rare in the State, and is well worthy of notice and protection.

Next to the ignorant immigrant, the most important factor in decimating the young game birds and the native insectivorous birds is the cat, which outside of cities exists in large numbers in the woods, and lives to a very considerable degree independent of human bounty. Any legislation tending to diminish the number of such cats should be looked upon with favor by thoughtful people.

In June, 1904, the biologist of this commission called the attention of the late chairman to the desirability of a first-hand knowledge of the effect upon game of the increasing number of foxes in the State. In addition to the efforts which have been made by the commission, individuals, and particularly the

Massachusetts Fish and Game Protective Association, have taken an active interest in the matter, and are now collecting testimony and information which should be of great value when it becomes necessary to decide the question of a State bounty on foxes.

Meantime, this commission will identify and record the contents of the stomachs of wild foxes. These stomachs may be sent to us at our expense. The purpose is to determine the economic value of the fox, by ascertaining the proportion of poultry, game birds, rabbits, mice and other animals in the natural daily food.

Information is also desired upon the destruction of the young of game and other birds (including poultry) by crows.

Especial efforts should be extended to the wood duck and the upland plover. The posting and guarding of breeding places is especially desirable.

BREEDING GAME BIRDS AND MAMMALS.

The ruffed grouse is the chief natural game bird of Massachusetts, and as such is worthy of more careful attention. The accompanying photographs, taken by Prof. C. F. Hodge of Clark University, Worcester, from birds reared in captivity from the egg, prove that the ruffed grouse may not be so unapproachable as our common experience indicates. The efforts of Dr. Hodge prove that this grouse can be domesticated, and the young reared in captivity in larger proportions than is usual under natural conditions. At present, however, such attempts should be limited to persons who have special interest and natural aptitude for such work. The most satisfactory starting point is the eggs, rather than the adults.

The following report was sent to our late chairman by Professor Hodge, detailing the results of his experiments in 1904 with ruffed grouse under domestication:—

WORCESTER, MASS., NOV. 25, 1904.

MR. JOSEPH W. COLLINS, *Chairman, Massachusetts Commissioners on Fisheries and Game, State House, Boston, Mass.*

DEAR SIR:—The permit from the Department of Fisheries and Game allowed me to take twelve eggs of the ruffed grouse for purposes of experiment. Five eggs were obtained May 28 and seven June 1, from nests not less than sixty miles apart, being taken from

two nests, in order to avoid the possibility of close interbreeding in case the birds reach maturity. The eggs were carried in the crown of a felt hat, between a thick pad of cotton batting and the head, — the first lot from 9 in the morning until nearly 6 in the evening, — and all hatched in apparently perfect condition, proving this to be an excellent method of transporting incubated eggs.

Cochin bantam hens were obtained by the kindness of Mr. Merrill from the Sutton hatcheries, and they brought out the respective broods May 30 and June 6. Food was supplied, but little was taken during the first day, and the chicks were left undisturbed in the nest. At the end of this time they were removed to warm nest boxes, placed within boxed yards covered with netting, which gave the chicks access to grass.

The weather was stormy and very cold, and despite every precaution against exposure a number of the chicks were taken sick, apparently with colds or pneumonia, and five died within the first ten days. One was killed in the nest the first day. Subsequently, two were snagged by cats which reached through the inch-mesh wire of their enclosure, and died in consequence of their wounds. This leaves four of the original stock, and at present writing they are as fine, vigorous birds as one could find in the covers.

About the first of October two wild birds which had flown against windows in the city were added to the flock. These, under the influence of the others, rapidly became practically as tame as they, and we thus have a stock of six healthy birds, from probably four different broods.

My plan of feeding has been to give the birds the greatest possible variety, — as much as practicable like the foods they would be likely to find in the woods, — and to study and note their preferences. The feeding can probably be simplified when we discover the staples and essentials. At first the chicks were given ripe blowfly maggots and pheasants' custard.* They were able to pick up the maggots from the second day on, and these remained the staple diet until well into August. The custard was plastered on rough boards placed on edge in the pens, since the chicks seemed to prefer to reach up for it. After the first three weeks, however, it could be placed in trays on the ground, and they continued to feed upon it as a staple diet until about the middle of September; after that its place was taken by live grasshoppers.

Along with the foods above mentioned, I gave, especially during the first weeks, great abundance and variety of small insects: plant

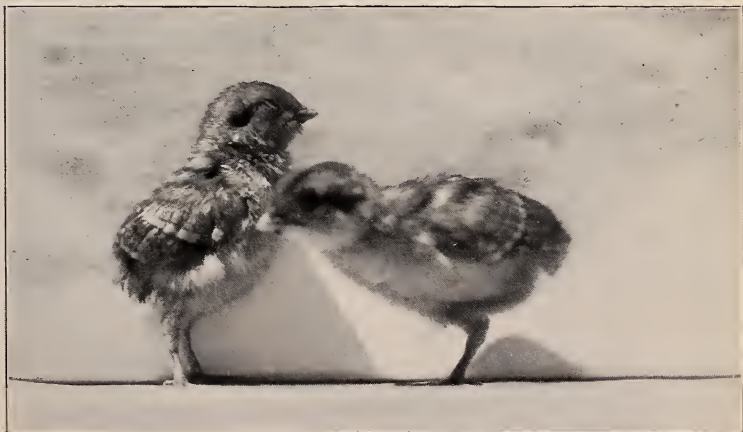
* I am again indebted to Mr. Merrill for supplies of maggots, and also for directions in regard to making pheasants' custard, viz.: to one pint of fresh milk add four fresh eggs, and beat; then steam or bake until solid.



RUFFED GROUSE ONE DAY OLD.



RUFFED GROUSE—THREE DAYS OLD.



RUFFED GROUSE—SEVEN DAYS OLD

Photographs from life by C. F. Hodge.



RUFFED GROUSE REARED FROM THE EGG.

Photograph from life, October 3, 1904, by C. F. Hodge.



RUFFED GROUSE FOUR MONTHS OLD.

Photograph from life by C. F. Hodge, October 3, 1904.



RUFFED GROUSE STRUTTING — Photograph from life, October 17, 1904, by C. F. Hodge.



RUFFED GROUSE.

This specimen, captured September 26, was
photographed November 2, 1904.

lice, thrips and rose slugs, spiders, "ants' eggs," mosquitoes and mosquito "wrigglers," small earthworms, flies and gnats; also small grasshoppers and moths, obtained by sweeping the grass and bushes with an insect net. The chicks were also given their freedom,—the free run of the lawn and garden as much as possible.

From the first day I kept the pens supplied with fresh chickweed, and the chicks began eating it on the second or third day. They also ate dandelion seeds, and were fond of the green heads of June grass. All kinds of fruits were offered them, and none of the native and common garden fruits was declined (with the exception of pears and peaches, which were scarcely more than tasted), from strawberries in June to apples in October. Raspberries, blackberries and mulberries were eagerly eaten, and blueberries and huckleberries formed a staple food during their seasons. Thorn apples, barberries and black alder berries were not refused, but were not taken in large quantities. Grapes of all kinds were greatly relished, especially Delawares. Chokecherries and especially black cherries were eaten in great quantities.

Although liberally supplied with green cabbage and fresh chickweed and generally lettuce, all of which the young birds ate daily, they also took quantities of all sorts of leaves (except grape, snowball, artichoke and *Rosa rugosa*) of the trees and other plants which grew in their enclosures: hawthorn, cherry, black cherry, apple, hackberry, chestnut, plantain, rhubarb, yellow dock, oxalis, all kinds of clovers and many others. Early in September they began to develop proclivities for budding, and were often seen nipping and tugging at small twigs. They ate chestnuts and acorns eagerly through October and up to the present.

The first moult occurred chiefly in August, and the adult feathers appeared in September, along with "snowshoes" and leggings. Soon after attaining their fall plumage they began to strut, after the fashion of the turkey gobbler. The tail is spread, the wings are dragged on the ground and the ruff is thrown out around the head, and a great deal of bowing, shaking the ruff and hissing is indulged in. The male and female of the ruffed grouse are not distinguished by any marked differences in plumage. I supposed at first that strutting was definite indication of male sex, but doubt if this is the case with young birds. With turkeys the young of both sexes strut. At any rate, all the birds that I have reared from the egg have strutted more or less, and still, from their size and other characteristics of head and neck, I am inclined to think that three of them are females. Neither of the wild birds have shown any signs of strutting, although apparently perfectly at home with the others.

As far as domesticability is concerned, our ruffed grouse are tamer

than most barnyard fowls. They have not evinced instincts of fear at any time to any remarkable degree. They feed readily from the hand, and will hop upon the knee — even the wild ones — to do so. They have not drummed as yet, but it is to be hoped they will in the spring. The outlook is good for nests and broods next season, if present health and vigor of the birds can be taken as any indication of future possibilities.

C. F. HODGE.

WINCHESTER. — The breeding and rearing of game birds and animals were carried on at this station as usual, although the results were unfavorably influenced by conditions beyond our control. Everything practicable was done to secure a record output; Commissioner Brackett gave his almost undivided attention to the supervision of the work; but human skill and care were not sufficient to successfully overcome such natural and artificial obstacles as were encountered. Concerning these, more detailed mention will appear under the following heads.

Pheasants. — The long-continued cold of last winter affected the vitality of the pheasant eggs. There was also a falling off in the number of eggs, there being upward of 700 less than the previous year. Similar results were also apparent in the breeding potentialities of common domestic fowl.

The early young pheasants were unusually weak, and many of them died; but as the season advanced, and green food could be supplied to the breeding birds, this condition disappeared, and the latter part of the season the results were better.

As the age of the breeding birds and the deterioration consequent upon close confinement may have had some effect in producing the results of the past season, it may be desirable to turn out a part of the old birds each year, as, by giving them their freedom, change of food, etc., they will quickly recuperate.

The disease introduced by the foreign birds two years ago has been checked, appearing in only one locality this year, and in a mild form; we lost only a few birds from it. Every effort has been made to eradicate it; among the remedial measures taken has been repeated treatment of the ground with heavy dressings of air-slaked lime, well spaded in.

An unusual occurrence took place during the past year. Apparently all the rats in the neighborhood combined in an attack on the birds and rabbits. They swarmed in the barn, pheasant coops and stone walls; it was a veritable pestilence of rats. Every available means, such as guns, traps and strychnine, were employed to get rid of the rodents. Between 200 and 300 were shot or trapped. The number destroyed by poison is unknown. Some were remarkably large; one measured 17 inches from nose to tip of tail. He did not hesitate to attack a full-grown bantam hen.

The blasting at the adjacent quarry was unusually heavy, rendering the incubators useless. The effect on the eggs under hens was partially overcome by making deep nests of straw, which more or less broke the sudden jar.

The pair of birds which are a cross between the Mongolian and golden pheasant hatched late last year, and moulted while the other birds were breeding, which may account for their not showing any inclination to breed this year. They are remarkable for their beauty of form and color, and they excel in these particulars any variety of pheasants bred for game we have seen. Six more young birds have been added this year, — 4 males and 2 females. It is believed they will unite the hardihood of the ring-necked pheasant with a combination of the rich plumage of the ring-necked and golden pheasant, — a wonderful blending of beauty. If it is found that this cross will breed, a new game bird will have been added to our farms. Of Mongolian pheasants there have been 208 distributed from this station this year (to November 1); 136 young, 69 old and 8 of the cross are now on hand, housed for the winter.

Commissioner Brackett thinks the work at Winchester has been more or less handicapped because the hares and pheasants were in the same enclosure.

Belgian Hares. — The rabbits grown old in captivity became less prolific, and the stock is gradually being changed to younger and more virile individuals. Under conditions even more severe than they would be subject to in their wild state, they remain perfectly healthy and vigorous. There is, probably, no other strain of what is known as the Belgian hare that will successfully withstand such extreme exposure. This has been accomplished by careful selection and breeding. The “hundred-dollar prize

Belgian hare" presented to the commission has been exposed to the same conditions as the others, and, with the exception of a slight attack of snuffles, has so far remained healthy. She is a beautiful animal, and if she breeds it is hoped that the increase may be used to improve the present stock, and thus secure a more perfect type of the Belgian.

One hundred and forty rabbits were distributed previous to November 1, leaving 34 for breeders and also 20 young ones.

SUTTON. — The following is the report of the superintendent of the Sutton hatchery, detailing the results of breeding pheasants and Belgian hares for distribution : —

WILKINSONVILLE, MASS., Dec. 12, 1904.

Commissioners on Fisheries and Game, State House, Boston, Mass.

GENTLEMEN : — The brood stock of pheasants was increased this season to 46, — 8 cocks and 38 hens; but was reduced before the breeding season was over by the loss of 8 hens, 4 dying and 4 escaping by breaking through the lath tops of the older pens.

The average number of eggs per bird was about the same as last year, — about 30; but the total was much larger, — 1,227. On two occasions when the pheasants in certain pens had ceased laying they were moved to new quarters, and as a result these began laying again. One pen of 7 birds had laid 131 eggs and seemed to have completed their litters, when they were moved to the largest of the winter pens, which had an abundant growth of green food; they resumed laying, and during the balance of the season laid 174 eggs. Another pen of 5 birds that had entirely ceased laying were given the run of three pens, and laid 60 eggs additional. The pens ordinarily used for breeding pens are too small to give the best results. The hatching and rearing gave less satisfactory results than usual, due to uncertain causes, but in part to less fertile eggs, and in the case of rearing to cold, wet weather. Several lots were wholly lost, and of the birds reared one-half came from one lot that was favored by exceptionally fine weather. The necessity of meeting the conditions imposed by the unfavorable weather led to much experimental work on the coops and runs and in the care of the birds, and many improvements were devised, some of permanent value.

It was found to be of considerable advantage to darken the coops in chilly weather, and it was so arranged that this could be done; also to confine the hens in semi-darkness, while the chicks could run into the yard. This close confinement, besides inducing the hen to hover the chicks more, checked much of the loss from too vigorous scratching on the part of the hen.

Of the other improvements, the most important was the construction of yards that would hold the young when quite small, and keep them under conditions for rapid, healthy growth. These were made possible by a large amount of fish netting sent to the hatchery, which was used to cover low enclosures of fine mesh wire, two to three feet high being found to be high enough for the sides, and this was secured by using wire two feet wide, with a board at the bottom. The top netting was stretched tent like, supported by poles and ropes, and tall bushes in the enclosure were covered without cutting. The chicks, when past the tender age, grew more vigorously than any season heretofore; and the only fatality that was plainly unavoidable occurred in August, when 23 were found dead or sick in various degrees of helplessness from a malady never before experienced; 5 recovered and 18 died.

Twice rats attacked the pheasants, and killed 24. Rats have always been abundant here, but this year they increased to an unusual extent, and did much damage in various ways. Nearly 100 were shot or trapped; but poison was not effective, owing, doubtless, to the amount of food available for them. Whenever their holes could be reached, bisulphide of carbon proved very deadly, and all that lived under the hen houses with cemented floors were killed; but the larger number living under the barn, hatchery and meat house could not be reached. Bisulphide of carbon was also used successfully in reducing the number of skunks about the place, and as soon as all other holes can be located these animals will be practically exterminated in this vicinity. Other vermin, except snakes, was perhaps less destructive than usual, because the chicks were better protected in the new pens.

It is probable that no snakes visited the pens when the birds were small, as none were seen then. Later, when the birds were grown, 5 large black snakes, 48 to 57 inches in length, were killed in and about the pens. Crows and cats gave no trouble after the birds were put under the netting, but it is possible that the latter may learn to tear through when the netting gets old. The improvements recommended last year that have not been made are now still more urgently needed. A make-shift cook house was extemporized from spare lumber, but it was not very convenient or satisfactory, and the work done in it must be largely increased another year. The proposed basement under the barn is no longer a project for the future, but is needed for present use, especially for storage of the rapidly increasing equipment used for hares and pheasants, and for the accommodation of such incubators and brooders as must soon be adopted. Better houses and more yards should be provided for the hens that are kept for rearing the pheasants. During the present season the proceeds of the sale

of hens' eggs and poultry have supplied all the grain used for feeding the hares and pheasants, as well as their own grain, and in addition have provided other supplies, the whole amounting to nearly \$200. It would be easily possible to do much better than this with a moderate expenditure for better quarters.

Early in May 3 dozen western quail were received for breeding and experimental purposes. They came in good condition, but without notice; and, as no preparations had been made to receive them, they were put into an empty pheasant pen until suitable quarters could be provided for them. The non-arrival of material resulted in a long delay in making the pens, and before these were ready the birds had weakened and many died, all of the lot eventually dying, except several that were separated soon after they were received. These were put in the large pheasant pens, in hopes that they could be left there; but the mesh was not small enough to hold them, and they escaped. Most of these were later recaptured and returned to the large lot. It is believed that at least one pair bred near the hatchery, as they were seen during the summer, and later a flock of young was discovered. One female quail escaped from the large pheasant pen, but entered an adjoining pen and lived there all summer with the pheasants. At one time it left the pen, which it could easily do, but returned, seeming to prefer living with the pheasants. It was found in September dragged into a rat hole, evidently having been killed by the rats. There is no reason to think that it died from any natural cause, or was sick when the rats captured it, for it was as active as any wild bird, and seemed as healthy and strong as the pheasants with which it lived. The only thing proved by the experience with this lot of birds is that they cannot be closely confined or left in large numbers. It was the aim in building pens to separate them into small lots, no more than a pair in some pens, and in building pens to enclose brush-covered grounds, where they could find good cover. The pens were constructed, but the loss of the birds nearly as soon as they were finished gave no opportunity to test them. The experience with the bird that lived with the pheasants under conditions similar to those proposed for the others makes it evident that some good results might have been achieved if the pens could have been ready for the birds as soon as they arrived.

Rearing Belgian Hares. — This was the first season that Belgian hares were bred at this station. The work was attempted on a small scale, more to acquire a stock of breeders and practical experience than to breed for distribution. It is, however, probable that a large distribution can be made another season, as a well-selected stock of breeders is on hand, and the location is suitable for the work. Sixty-two were liberated (including 10 in the woods near the hatchery), and

20 were reserved for breeders. The stock was improved by a buck and 2 does presented by Deputy Shea. The progeny of these will form a large part of the brood stock for another season. Most of the hares were wintered in a large yard and lived in two burrows, which they excavated after a start was made for them by putting a piece of tile pipe through the frozen ground. A number were kept in a small run, but allowed to make a burrow after a start was made in the same way. One of the burrows was traced in the spring for about thirty feet and to a depth of over ten feet. Eight hares lived in the large yard and bred there in the spring. No evidence appeared that the young were interfered with in any way. When the frost left the ground they made no attempt to escape by burrowing under the fence, although no precautions were taken against this. During the summer the hares were bred in small runs, but the results were not altogether satisfactory, as at times they seemed to breed very slowly, and several litters were lost through causes that seemed due to the restricted quarters. There is a decided lack of economy in the use of the small pens. There is a greater waste of food, much coarse food that would be available in a run or warren cannot be utilized, and the labor in caring for them is vastly increased. It is not certain that there is any good reason for using the small pens here. In many trials keeping the buck and the doe together did not result in the loss of any young killed by the buck; and it ought to be possible to devise a yard where a colony of 6 to 10 will live and breed together, thus effecting a saving in the food used and labor in caring for them, with probably better results from more rapid breeding and more vigorous stock. It may be suggested that the close confinement of the hares in the pens in use will not produce the best stock for taking care of itself when set at liberty. Stock bred in large yards should be more vigorous, and if in yards where it could be made to subsist partly on brush and other growth in the enclosure, it ought to be in better condition to take care of itself when liberated. For the ensuing winter the hares have been divided into several lots, some allowed to make burrows and some in the ordinary boxes with a protection of leaves; but the greater number have been placed in a yard containing large piles of brush and leaves, under which it is expected that they will burrow and live. One pile is of great size, and has accumulated for several years from hard-wood brush cut in leaf when clearing land. Burrows are furnished as well as the regular breeding boxes, in order to provide for any failure to use the brush heaps.

A very limited amount of supplies has been purchased for the hares; the grain used has been paid for by the hens kept for hatching pheasants. Other food has been produced on the grounds. Clover was grown in considerable quantities, lawn clippings were

saved, and hay was cut and used when half grown, thus securing the proper fineness; leaves were raked in large quantities in the fall and fed through the winter. The hares eat these as freely as any food offered them. During the summer large quantities of sprouts and leafy twigs were cut and cured. All kinds of roots suitable for feeding and many forage plants were grown, and an ample supply for winter and summer produced; carrots and sugar beets, mainly for winter, and nearly all the common forage plants for summer. Rape and corn were found to be the most satisfactory for summer use, and will be grown largely in the future; but practically everything grown in a garden can be utilized, and it is possible that the hares thrive and breed better with a suitable variety of food.

Respectfully submitted,

ARTHUR MERRILL,
Superintendent Sutton Station.

It is hoped that the commission may soon undertake actively, even if on a limited scale, the propagation of the two chief game birds of Massachusetts, — the ruffed grouse and quail; thus in time it may be no longer necessary to depend upon a precarious source of supply in other States, — a supply becoming annually smaller and more expensive. There is no reason to doubt that birds can be reared in Massachusetts sufficient to stock our covers at less expense than they can be purchased and brought here from other States. As a general biological principle, the greater attention should be given to the maintenance, by artificial propagation and protection, of our native game birds, *e.g.*, the ruffed grouse, quail, woodcock, upland plover, wild pigeons and wood duck, all of which are suffering, some to the very verge of extinction, from over-hunting and other unfavorable conditions. Suggestions have come to us that the commission should undertake the propagation and distribution of certain European game birds, *e.g.*, the capercaillie, black cock, European quail, red-legged partridge, etc.; but the writer believes that attention should first be devoted to our native game birds, which are beyond a doubt adapted to our covers and to our methods of hunting. If it seems advisable to introduce other game birds, might not the prairie chicken (the pinnated grouse) prove most suitable to our more open sections, particularly in the farming sections of the State? It is the opinion of many ornithologists that in the past the pinnated grouse inhabited southern New England.

Intelligent fostering and feeding are likely to make this region again a suitable environment for this noble game bird. Organized attempts to rear the pinnated grouse in captivity should be welcomed by the people of Massachusetts.

THE FISH AND GAME LAWS AND THEIR ENFORCEMENT.

In spite of the fact that many complaints of the non-enforcement of the game laws have reached this office, either directly or indirectly, there is abundant evidence that commendable results have been obtained by our deputies. It is not the purpose of the commission to make merely a record number of arrests, convictions, or fines imposed. The attempt is made to enforce the laws without prejudice or spite; to deal sharply with wilful law-breakers, leniently with ignorance and unintentional violations, and squarely with all. The deputy should be in a large measure an educator; he should impart a knowledge of game and woodcraft; he should carry the spirit of justice and the breadth of view which contact with nature furnishes, and he should not descend to petty considerations. To the habitual violator of the game laws he should be an implacable and untiring enemy, with whom no compromise is possible. More than ever before this ideal has been before us, but we hope to make still more substantial advances.

There are large areas of the State where the deputies can rarely penetrate. With the gradual increase in the number of deputies and the improved transportation facilities, these conditions are constantly improving. Even the occasional appearance of a deputy in a section has a restraining influence on would-be violators.

The increased number of sportsman's clubs is of advantage to the State; they can do much to mould public sentiment in their neighborhood, and by example and precept make for greater respect for law and the rights of the various classes of the community. These clubs not only do much to actually provide game for the covers, but they inculcate an intelligent interest in the fish and game problems of the State.

Of the new laws, the right-of-search law has, on a year's trial, proved its value. However, the anomalous condition still obtains that the satisfactory enforcement of fish and game

laws is demanded, when the officer has no right to require a person, whose pockets, game bag or creel may be full of illegally taken game, to show whatever game he may have on his person. Such a condition puts a premium upon "spotter" methods, and is to be deplored.

The present paid force consists of fourteen deputies, located at the following places: North Adams, Ware, Spencer, Palmer, Ayer, Franklin, Gloucester, Lynn, West Quincy, Hyde Park, North Cambridge, East Boston, South Boston and Harwich.

Experience has shown that the most satisfactory method of enforcing the fish and game laws is by a number of young, active men, having a special knowledge of fish and game, in addition to some detective and executive abilities, — a body interested in the special objects and duties of the commission, in addition to responsibilities as police and detectives. The State, rather than the county, city or town, is the unit. Any deputy may be sent to any part of the State, and the deputies are so located that at least two men can be present in any part of the State at short notice. Thus each particular section gets the benefit of the entire force when necessary, in addition to the local force of police and constables which may be called upon to co-operate with the deputies.

There is need of two additional paid deputies in the western half of the State, one located at Springfield and the other at Pittsfield, and the necessary provisions for these should be made this year. The methods of selecting paid deputies by competitive examinations should be continued. It has been proven that the special knowledge of fish, game and of localities adapted for the various species, together with a personal acquaintance among the class of people most interested, make the deputies the most efficient agents in the distribution of the fry, fingerlings and game birds and animals which comes within the scope of the work of this commission. The work of enforcement of laws and the stocking is done at far less expense to the State, and with a greater degree of efficiency both as to actual distribution and the subsequent observations of the results of the stocking, when carried on by the same force. Our deputies are, therefore, able to give attention to several duties on the same trip: the distribution of live fish or game; gath-

ering statistics or information on subjects pertinent to the work, which are made subject to special reports, or are incorporated in the daily narrative reports filed weekly at the office. At all times, on whatever duties, they are on the watch for offenders. In cases of unwitting violators the culprit is usually given advice and warning; in general, only flagrant cases are placed under arrest. The best results are to be expected when the officers who enforce the laws are in close contact with the commission which is placed in charge of the fisheries and game of this Commonwealth. In any event, if the laws are not enforced the responsibility therefor is readily fixed.

The number of instances where sawdust is discharged into the State waters, to the injury of the fish, is happily diminishing, as a result of the activity of our late chairman, Captain Collins, and the deputies under his direction.

On September 6 he in person visited Tarbell's sawmill, near Massapoag Pond, at East Groton. Complaint had reached the commission that proper care was not being exercised at this mill to prevent the discharge of sawdust into the stream. Earnest promises were made, however, that everything practicable would be done to insure proper conditions, so that no sawdust should get into the stream hereafter.

Also, on September 7 he visited the so-called Shaker sawmill at Ayer, and found there was sufficient opportunity to blow out the sawdust made or to carry it away by building a small bridge of such waste material as the saw mill would produce, and also making a pen under the mill.

On the same date the two mills of Andrew Kemp, in Pepperell, were visited, where it was seen that there was an excellent opportunity to blow out the dust or to haul it out on carts, as the owner might prefer.

Satisfactory arrangements were made in the above cases.

The following towns have accepted the provisions of section 68, chapter 91 of the Revised Laws: Cohasset, Charlton, Dudley, East Bridgewater, Freetown, Groton, Harvard, Holden, Lynnfield, Lakeville, Millbury, Pembroke, Peabody, Shrewsbury, Wayland, Wakefield, Webster and Westhampton.

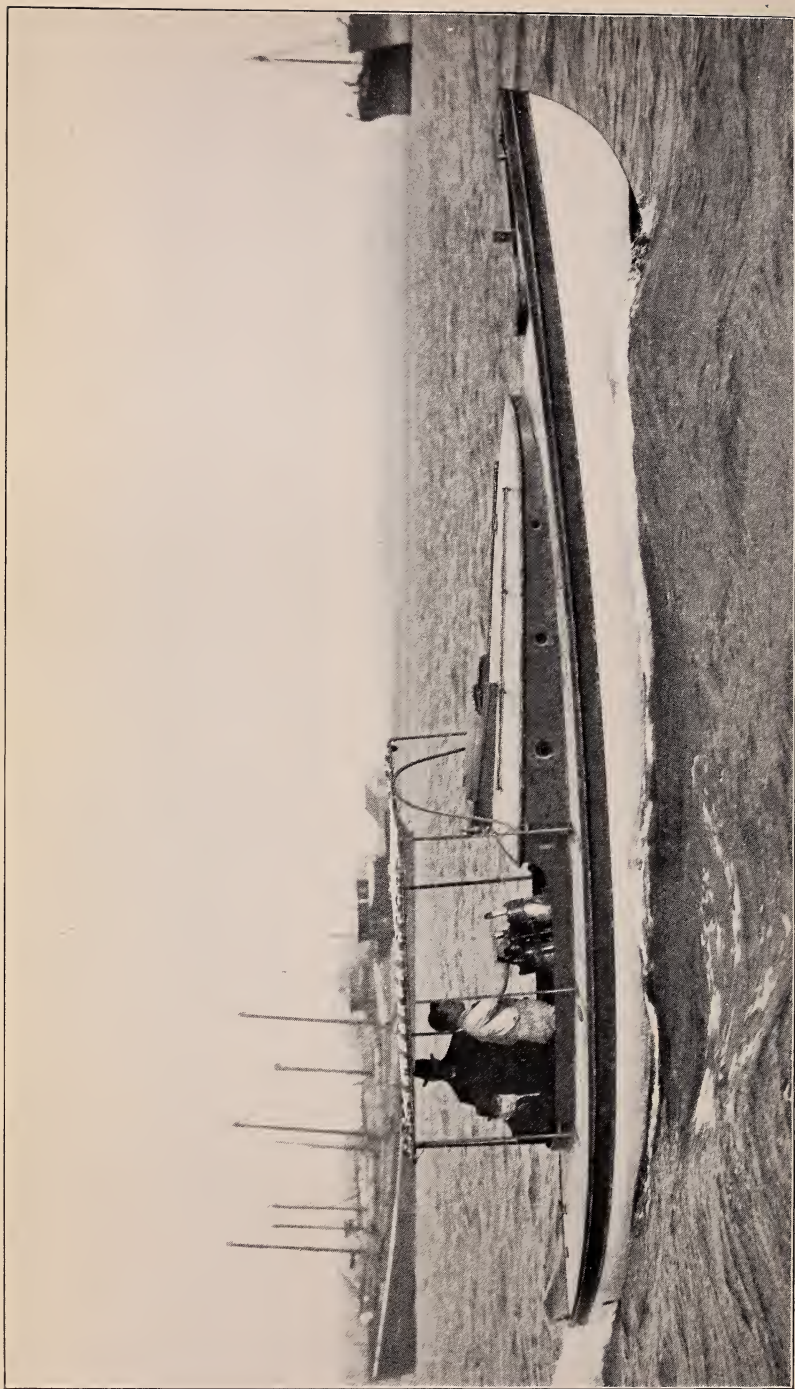
In some cases where the deputies enforced this law the inhabitants found an unexpected state of affairs; as in the case

of Assowompsett Lake, that part within the town of Lakeville could be fished only with one line, held in the hand (according to section 68); but in the portion of the lake within the limits of Middleborough ten hooks could be used, according to chapter 308, Acts of 1904. These conditions depended upon the fact that Lakeville accepted section 68, while Middleborough did not. This state of affairs has led to considerable local friction and uncertainty among the people as to their rights. The commission has advised in many cases, and where possible has shown leniency to those who showed no disposition to intentionally violate the laws.

With the rapid increase in the number of deer, there has been a multiplication in the arrests in connection with the killing of deer, and the ownership or possession of dogs which chase deer with the knowledge and consent of their owner. There is at present a conflict of interests between the owners of fox hounds, on the one hand, and those interested in deer and game birds. It is desirable that dogs which are inclined to run deer should not be permitted to run at large. It is also proper that fox hunters should not be hampered in their sport, or their dogs become liable to be killed by irresponsible parties. There is abroad a misconception in regard to the killing of a dog found chasing a deer. A careful reading of chapter 92, section 18, Revised Laws, as amended by Acts of 1902, chapter 154, indicates that the dog should not be killed unless he is used for hunting deer with the knowledge and consent of the owner. It is difficult, in most cases impossible, to prove the "knowledge and consent;" yet, as has sometimes happened, irresponsible persons have killed dogs found chasing deer. This may cause hardship to owners of valuable fox hounds, though intended to deal chiefly with such owners and dogs as habitually break the laws.

The deputies of this commission have been instructed to kill no dog (under the above laws) without the consent of the owner.

Upwards of 50 specific instances have been investigated during 1904 where dogs had chased deer, and in at least 12 cases it resulted in the death of the deer. With the rapid increase of deer such instances are likely to be multiplied. A few fines of \$20, in accordance with chapter 92, section 18, Revised



THE LAUNCH "SCOTER," RUNNING DOWN BOSTON HARBOR AT FULL SPEED.

Laws, as amended by chapter 154, Acts of 1902, would tend to awaken certain dog owners to a proper sense of their responsibilities.

Complaints still come to this office that our deputies are "not enforcing the Sunday fishing laws." In reply to such, we continue to call attention to the decision of the late Attorney-General Knowlton, that the enforcement of the laws against Sunday fishing (section 12, chapter 98, Revised Laws) does not properly come within the sphere of activities of this commission, but belongs to the local police. During the past year 55 arrests have been made for Sunday hunting. Sunday hunting, particularly during the shooting season, is still prevalent in the remoter sections of the State; but beyond question it is less obtrusive than formerly, and causes less annoyance to law-abiding people. The largest number of arrests have been for Sunday hunting. An even greater number might have been made for Sunday fishing, were it not for the fact that our deputies have been ordered not to enforce the Sunday fishing laws, for the reasons given above.

In regard to the snaring of partridges, we again call attention to the fact that the snaring of ruffed grouse or partridge, now permitted by law on one's own property, should be completely prohibited.

The second season of the naphtha launch "Scoter" has confirmed the value of this type of equipment for enforcing the laws regarding fishing and shooting along the coast. The opinion that this one boat, by reason of its mobility, is equal in law-enforcing efficiency to a hundred men stationed along the coast, is borne out by facts. The most important feature of the work of the "Scoter" is the restraining influence of the knowledge of the boat's presence in the neighborhood. To secure conviction, the short lobsters must be in actual possession. If the lobsters are thrown overboard, even before the very eyes of the deputy, but before they can be seized, no conviction can be made. From the daily reports of the work of the "Scoter," it appears that her presence among the fishing-boats is directly responsible for the freeing of from 200 to 5,000 short lobsters daily during the fishing season, when the weather permits lobster fishing, — an aggregate of not less than 600,000 short lobsters. Attention has elsewhere been called

to the fact that the present lobster laws are extremely difficult of enforcement, chiefly on account of the measurement features. Yet, in spite of this fact, 19 arrests and 18 convictions were made from the "Scoter" in Boston harbor or vicinity: 390 short lobsters were seized, and the aggregate fines imposed were \$846.

The system of appointing unpaid deputies continues to grow in public favor. No efforts will be spared to dignify the service which these men furnish to the Commonwealth. Many business and professional men of highest character and attainments have enrolled themselves in this work. While to a certain degree the ranks of the unpaid deputies serve as a training ground from which the paid deputies may be selected, many of the unpaid deputies serve without expectation of other compensation than the personal satisfaction of having properly performed certain duties and responsibilities of citizenship. It is a privilege to refer to the hearty co-operation evident between deputies, and frequent setting aside of personal interests for general good.

As during 1903, the paid force of deputies has continued to work in unison for the advantage of the Commonwealth. Instances of personal bravery in the discharge of duty, cases of undaunted exposure of life and limb to secure results, of cool judgment under trying conditions, have been noted. In general, the commission and the Commonwealth are to be congratulated upon the personnel of its force of paid deputies. It comprises representatives of many interests and diverse ancestries; but all unite in zeal, in unselfish co-operation or "team work," and have again proved themselves well worthy of the confidence of all the people of the State.

The report of Deputy John F. Luman, who for the past year served most faithfully and with intelligent efficiency as chief deputy, follows: —

BOSTON, MASS., Jan. 10, 1905.

Dr. GEORGE W. FIELD, *Chairman, Fish and Game Commission, Boston, Mass.*

DEAR SIR: — I herewith submit my annual report for the year 1904, as follows: —

The greater part of the year I have been engaged at work in the office at Boston in the capacity of chief deputy, in charge of the law-

enforcement work, with the exception of a few months during the spring and summer, when I was engaged in the distribution of fish and animals, and also field work.

Trout Fishing. — Trout fishing during the past year has been very satisfactory, especially in the central and western sections of the State. Large fish and plenty of them have been taken, which shows that the stocking of the streams year after year by this commission with fry and fingerlings has not been a waste of time or money, and the work is now beginning to show for itself in no mistakable manner. I beg leave to call the attention of the Board to but one of several remarkable catch of trout in the town of West Brookfield in Worcester County, made by two well-known citizens, James Haskins and Calvin Perry, who took from the waters of that town 11 trout, the largest fish weighing $1\frac{1}{2}$ pounds, while 7 of the larger trout tipped the scales at 8 pounds. This only tends to show what continued restocking of the streams will do. The reports submitted by the various deputies relative to trout are also very encouraging.

Game Birds. — Woodcock have held their own, and in and about Fitchburg an unusual number have been reported. Quail have been very scarce, due to the extreme cold weather of the past year. There has been reported in different sections of the State now and then a flock, but these are thought to have been the imported ones which have been liberated by clubs and private individuals. Partridge shooting, notwithstanding all predictions before the season opened, has been very good, particularly in the western section of the State, where the birds have been as numerous, in fact, as at any time in the past three years.

A large number of birds have been left over from the season just closed, and with a good hatching season I am quite certain that birds will be found in abundance at the opening of the season of 1905, if reports from various sections of the State are true. From the reports of several sportsmen and others who have hunted in the western section of the State of Massachusetts, all are united in the opinion that western Massachusetts is certainly *the* bird section.

Small Game. — Such, including squirrels, rabbits, hares and pheasants, has held its own, and in some localities has increased. Pheasants have increased wonderfully in the eastern section of the State. Hares are reported scarce.

Deer. — From nearly every section of the State deer have been reported as seen, and there is no doubt that they are rapidly increasing. They have been seen in numbers in certain sections, namely, in Palmer, North Adams and Templeton. There have been several illegally killed in the State. Deer have been run by dogs in many towns, and it seems that something must be done to prevent this

violation, which has become very frequent during the past year. Where dogs were found chasing deer, and were known, notice has been sent to the owners, informing them of the fact, and asking them to try to prevent a future occurrence. Deer killed in the woods and bearing evidence of having been shot were found in Pittsfield, Concord, Coldbrook, Winchester, Ballardvale and Plymouth; one found with a broken leg at Cheshire, December 31, had to be killed; one found at Still River, March 2, legs cut off by railroad train, had to be killed; one struck by train at Hoosac Tunnel had to be killed; one killed by train at Lunenburg, March 17; one at Pittsfield injured by dogs so that it had to be killed; one killed at Greenfield by dogs, February 13; two killed at Sterling, having been chased by hounds, February 24; one killed at Harvard by dogs, March 2; one killed at Petersburg mountain, March 12; one killed by dogs at Rowley, February 24; one killed by dogs at Georgetown, March 21; one killed by dogs at Boxford, March 7; one chased by dogs, April 1, at Quisset, drowned; one chased by dogs into Ipswich Bay and drowned, May 22; one found dead in the canal of the Ludlow Manufacturing Company, at Ludlow, March 1, having been chased upon the ice by dogs and drowned. Complaints were received from the following towns that dogs were chasing deer, all of which were investigated: Westfield, Russell, Fairfield, Huntington, West Ware, Monson, Palmer, Georgetown, Sandwich, Rowley, Leominster, Sterling, Plymouth, Hardwick, Winchendon, Gardner, Brimfield and Rowley. In several instances the owners of the dogs were unknown. To the owners of dogs, when the owners were known or could be learned of, the following notice was sent:—

DEAR SIR:—Complaint comes to this department that your dog chases deer. Chapter 92, section 18, Revised Laws, as amended by chapter 154, Acts of 1902, makes this offence punishable by a fine of \$20. I call your attention to the matter, in the hope that you will see that it does not occur again. Trusting that you will receive this letter in the same friendly spirit in which it is sent, I remain,

Yours very truly,

JOHN F. LUMAN,

Chief Deputy.

There is nothing to prevent a person inclined to kill a deer in Massachusetts from doing so, and saying that it was sent to him by a friend in Vermont, Maine or New Hampshire. A law making it a penalty to have deer or parts thereof in possession without a tag, bearing the date when it was killed, by whom killed, and where, would greatly facilitate the disposition of such cases. A large number of deer were found killed by unknown hunters in the State. Something must be done to prevent further killing.

The new search law, so far as it goes, is all right, but it does not give the deputies sufficient chance to bring the guilty ones into court. I would suggest a law which would give the deputies the right to approach any person who is hunting or fishing, and, after making his office known by displaying State shield or badge, ask him, in the name of the Commonwealth, to show his fish or game, if he has any; if such person refuses to do so, give the deputy the right to take him to the nearest police station or lock-up, and there search him; if nothing illegal is found, let the person go, without making or holding the deputy liable.

Little or no snaring of birds has been reported, although some snaring is being done by persons on their own land. The sale of partridge, we have reason to believe, from information received, is being carried on to some extent. This offence is one of the hardest our deputies have to contend with, from the fact that the person buying is as guilty as the person selling; therefore, information is not forthcoming. I believe that the laws have been better enforced this year than any previous year. Citizens seem to feel in harmony with the commission, and appear willing to assist in every way possible. I would recommend a new law relative to the dogs found chasing or hounding deer, as the present law is not adequate to meet the increasing offences in this line.

The work done by the paid deputies during the past year has been much in advance of the work done by them in any previous year since the commission was organized. The force of deputies consisted of 14 paid men, who served nearly the whole year. In addition, there have been employed 8 special deputies, who were on salary during the hunting season in October and November. The specials have done good work in connection with the regular paid force, and I think the scheme is advisable and advantageous. The total number of arrests during the year 1904 was 265; number of convictions, 227; total amount of fines, \$4,297.90, — an increase over last year of \$1,872.90.

Respectfully,

JOHN F. LUMAN,
Chief Deputy.

The following figures indicate briefly some of the facts connected with our enforcement of the game laws. No reference, however, is made to the ill-founded complaints which have been investigated, or of the cases where in the opinion of the commission a proper warning would meet the purpose of the law, where no violation was intended.

SUMMARY.

Number of arrests for Sunday hunting,	55
Number of arrests for fishing closed waters,	41
Number of arrests for possession of short lobsters,	37
Number of arrests for taking shellfish illegally,	28
Number of arrests for owning or keeping dogs that chase deer,	22
Number of arrests for killing deer,	4
Number of arrests for shooting song birds,	24
Per cent. of offenders of foreign birth (judging by names),	46
Total number of cases taken to court,	265
Convictions,	227
Cases discharged,	35
Cases placed on file,	48
Fines from arrests made by unpaid deputies,	\$1,368 40
Fines from arrests made by paid deputies,	2,929 50
Total fines imposed,	4,297 90

NEW LEGISLATION.

We respectfully recommend the following additions and changes in the fish and game laws.

We urge, in the interest of uniform legislation, the following laws, which the delegates from the lobster-producing States, at the convention held in the State House, Sept. 23 and 24, 1903, voted to recommend to their respective Legislatures:—

1. All lobsters or parts of lobsters sold for use in this state, or for export therefrom, must be sold and delivered in the shell, under a penalty of twenty dollars for each offence; and whoever ships, buys, sells, gives away or exposes for sale lobster meat after the same shall have been taken from the shell, shall be liable to a penalty of one dollar for each pound of meat so bought, sold, exposed for sale, given away or shipped. Any person or corporation in the business of a common carrier of merchandise, who shall knowingly carry or transport from place to place lobster meat after the same shall have been taken from the shell, shall be liable to a penalty of fifty dollars upon each conviction thereof. All lobster meat so illegally bought, shipped, sold, given away, exposed for sale or transported, shall be liable for seizure, and may be confiscated. Nothing contained herein shall be held to prohibit the sale of lobsters that are legally canned and hermetically sealed.

2. No person or corporation shall engage in the lobster fishery in this state without a permit from the fish and game commissioners, which permit shall be furnished free of cost to the applicant, and

shall contain a copy of the laws for the protection of the lobster. Any person who engages in lobster fishing without a permit from the fish and game commission shall forfeit not less than one hundred dollars, or be liable to imprisonment, or both fine and imprisonment, at the discretion of the court. The above should not apply to individuals taking a small number (not exceeding five daily) for their own use and not for sale.

A person holding a permit, who is convicted of a violation of any of the lobster laws, shall surrender his permit to the fish and game commission, and it shall not be reissued within one year from the date of its surrender. Failure to surrender a permit will make the holder liable to a penalty of not less than fifty dollars, and the confiscation of the pots and boats used by him for lobster fishing.

There is no law upon the statute books so difficult of enforcement as the present lobster laws. Persons so inclined keep the short lobsters where they can be readily dropped overboard on the approach of the deputies; or they are held until opportunity offers to transport them to Rhode Island or to New York, where they are salable. Yet there is abundant evidence that fear of the "Scoter" checks, to a very considerable degree, the possession of short lobsters in Boston harbor and the waters adjacent. Several persons who dealt very largely in short lobsters have already been driven out of business, having found that the profits of the business are jeopardized by the activity of the "Scoter." Thirty-seven arrests were made during the past year for the possession of short lobsters, so that what was formerly carried on to a very great extent, even if not with impunity, is now attended with considerable hazard. There is need, however, of some means whereby the fisherman who has no respect for the law, or for his own benefit, or for the interests of his fellows, could be constrained by some powerful and readily applicable measure. Such a means is possible by the requirement of a permit for the catching of lobsters for sale. Such permit should not be necessary to a resident of the Commonwealth catching a small number of lobsters for personal use. This permit should be given without expense to the law-abiding fishermen, but should be taken from those convicted of breaking the lobster laws. The barring of such individuals from the benefits of the lobster fisheries would react to the advantage of those willing to abide by the laws.

It would be to the advantage of the people of this Commonwealth if suitable provisions could be made for extending chapter 408, Acts of 1904, with a suitable appropriation to rear the lobster fry to such a stage where it is practically free from the ravages of enemies. In the opinion of this commission, the experiments carried on by the Rhode Island Fish Commission and by the Canadian government on this line have been successful to a degree which warrants the adoption of the method by the State of Massachusetts.

The scallop laws (section 84, chapter 91, Revised Laws) fail to define a seed scallop, and are therefore defective. It is a fact that the scallop eggs are laid in May and June. The young hatched from these eggs become mature and lay eggs the following May and June, and the majority of these scallops die during the succeeding winter, after producing a single litter of eggs. The scallops which are less than one year old should be defined as seed scallops, since these are the main source of eggs for the following spring. The size of scallops is usually an indication of age, and the writer knows of no more satisfactory criterion by which to define a seed scallop than that furnished by measurements. This commission is qualified to make the necessary microscopical examinations, and to propose a proper and definite statement as to what should be considered a seed scallop.

It is obviously for the interest of the inhabitants of those portions of the State remote from the seashore, as well as of those living in proximity to clam flats, that the supply of clams should be such that an excessive amount of time or labor should not be consumed in digging. At present there are very large areas, between tide marks, and properly belonging to the Commonwealth, which have in the past produced great quantities of clams and quahaugs, but now, from neglect or from unsystematic digging, are producing far less than their natural capacity.

This commission is qualified, by knowledge and practice, to institute a system of clam propagation which will benefit the diggers, the dealers and the consumers in all parts of the State, and multiply several fold the wealth at present derived from the shellfish industries within this State. We therefore beg to call attention to conditions now existing, to the scarcity and high price of clams and quahaugs, and to submit the following

tentative plan for consideration as the basis of a law in the interests of clam and quahaug industries: —

1. Make a survey and plot of such public areas as appear to be available for cultivation of clams and quahaugs.

2. These areas shall be divided into two approximately equal portions. One of these portions shall be leased for periods of five or ten years to applicants who shall actively use the area for the commercial propagation and production of clams or quahaugs, under such regulations as the Commission on Fisheries and Game may impose from time to time.

The leased area in general shall not exceed 50 per cent. of the total area suitable for growing clams and quahaugs. The moneys derived from the leased areas shall be devoted to the stocking and improvement of the unleasable area, which shall be open to the public for the taking of shellfish, and shall be subject to such regulations as in the opinion of the Commission on Fisheries and Game are for the best interests of the Commonwealth.

The attention of this commission has been called to a peculiar case. By chapter 158, Acts of 1901, Lake Quinsigamond was closed to fishing between September 1 and April 1 until March 14, 1906. The people in that neighborhood now wish to terminate the provision of this act. They advance the statement that they wish to increase the number of trout in the lake. They have established a trout hatchery upon waters tributary to the lake, and subscribed a large sum of money to further the work. They claim that the pickerel are enemies of the trout, and that the number of pickerel in the lake limits the number of trout. They therefore seek the opportunity to reduce the pickerel by fishing or other legitimate means, for the purpose of making conditions more favorable for their efforts for increasing the number of trout in the lake.

We therefore recommend, if it appears that the majority of the people directly interested are in favor of trout in the lake rather than pickerel, that the Legislature take such action as appears desirable in this case.

We are of the opinion that black bass should be given some protection, especially during the season when they are guarding the nest.

The conditions connected with the protection of game and insectivorous birds are still unsatisfactory. The most prominent difficulty arises from the newly arrived immigrant, both adult and minor. Other States find that an alien license law is satisfactory and practical. The chief provisions cover the prohibition of hunting by unnaturalized inhabitants who are not provided with a license issued by the chief of police in the town or city where the hunting is done. The fee for such licenses should be at least \$10, and be provided with a photograph or satisfactory description of the proper holder of the license. The law should also require, when demanded by the owner or lessor of the land or by a person properly authorized to enforce the laws of the Commonwealth, the exhibition of the license and of the birds or animals killed or held alive.

At present there is nothing in the statutes to prevent any one having in his possession a deer killed in Massachusetts, claiming that the deer was sent to him. The law (Acts of 1903, chapter 245) refers to hunting, chasing, wounding or killing, but fails to cover possession. This might be obviated by an amendment, providing a penalty for having deer or parts thereof in possession without a tag, bearing the date and locality of killing, and by whom killed.

The new search law (chapter 367, Acts of 1904) upon the first year's trial has shown that the efficiency might be increased, without actually subjecting the hunter or fisherman to the personal indignity of a search. The suggestion is that the law give the commissioners and their deputies the right to approach any person who appears to be hunting or fishing, or killing or snaring birds or mammals, contrary to the laws of the Commonwealth, and, after making proper explanations, with the exhibition of tokens of authority, to make formal demand in the name of the Commonwealth to display all the game, fish and birds and mammals protected by law then in his possession. In case of refusal, the commissioner or deputy should have the right to take the person to the nearest police station or lock-up, where the search may be made, without incurring personal liability.

This same chapter (chapter 367, Acts of 1904) should also provide for the right of search for the bodies or feathers of certain birds referred to in Acts of 1903, chapters 244 and 329.

We beg to call attention to the following slight but important modifications : —

1. Chapter 162, Acts of 1903, fourth line, after the word July, insert "*a Bartramian sandpiper, also called upland plover;*" and after the word pigeon, insert "*a Carolina or mourning dove.*"

The passenger pigeon and the Carolina dove are two distinct species, and are the only wild pigeons likely to be found in Massachusetts. Both are on the verge of extinction; they require and deserve protection.

2. Chapter 176, Acts of 1904, sixth line, after possession, insert "*each,*" and cause to read, "each wild or game bird or animal protected by law."

3. Chapter 92, section 20, Revised Laws, first line after fines, add "*and forfeitures.*"

Suggestions 2 and 3 have come from judges dealing with cases under these acts.

4. Section 11, chapter 92, Revised Laws, fourth line, after game bird, insert words "*a wild or undomesticated bird, not exempt under Acts of 1903, chapter 329, and Acts of 1902, chapter 127.*"

The Acts of 1902, chapter 165, should be so amended that its provisions should not apply to quail kept or sold for propagating purposes.

It comes to our notice that many persons, mainly Italians, snare and trap game and insectivorous birds. Some more definite check should be placed upon this practice. The deputies very properly assert that the law should cover the possession of snares, bird lime, etc.

I also respectfully call attention to the limitations placed upon the work of the commissioners and deputies through lack of provision for the service of warrants by the commissioners or deputies. It often happens that in isolated places time and opportunities to secure convictions are lost through the frequent impossibility of finding a local police officer to serve the warrant.

Attention is respectfully called to the fact that on Feb. 13, 1905, according to section 16 of chapter 92, Revised Laws, the law for the protection of pheasants ceases to be operative.

We respectfully suggest that the following be embodied in a section relative to the ownership or possession of ferrets : —

Owners or possessors of ferrets shall notify in writing the commissioners on fisheries and game of the fact that one or more ferrets are in possession. The owners or possessors of such ferret shall also notify in writing the commissioners on the day that a ferret or ferrets leave the possession of the former owner or possessor, and shall, at the same time, give the name of the owner or possessor into whose possession the ferret passes. Ferrets which are not thus accounted for are liable to confiscation.

A case where one of our deputies suffered bodily harm when attempting to make an arrest for violation of fish and game laws brought out the fact that the right of the Commissioners on Fisheries and Game to appoint deputies is not stated with sufficient definiteness in the statutes as to preclude a difference of opinion among judges. A similar difference of opinion exists as to the rights of the deputies to call for assistance in making an arrest and to protect themselves from personal violence. These points are of prime importance in securing the proper enforcement of the fish and game laws, and we do not wish to have more cases thrown out of court on this ground. We therefore suggest the amendment of section 4, chapter 91, Revised Laws, so as to read as follows : —

SECTION 4. The commissioners are empowered to appoint deputies, and the commissioners and their deputies shall, for the enforcement of the fish or game laws; have the same powers as all officers qualified to serve criminal process, including the right to call in the name of the commonwealth for assistance according to section 31, chapter 210, Revised Laws, and may arrest with or without warrant any person whom they find violating any of the fish or game laws; except that persons engaged in the business of regularly dealing in the buying and selling of fish and game as an article of commerce shall not be arrested without a warrant for having in possession or selling game at their usual places of business.

We recommend that some provisions be made so that towns which have accepted section 68, Revised Laws, can have power to reconsider their action.

COURTESIES.

The commission has received from the United States Bureau of Fisheries, Department of Commerce and Labor, consignments of eggs of brook and rainbow trout, landlocked salmon and pike perch, also a shipment of shad fry. We have likewise received from the Bureau statements of its fish cultural work in this State, and various of its publications, including monthly statistical statements of the fish landed from fishing vessels at Boston and Gloucester.

The post-office authorities and others have permitted the display of posters containing abstracts of the fish and game laws.

The railroads within the State, notably the New York, New Haven & Hartford, the Boston & Albany and the Boston & Maine, have, as formerly, carried free shipments of fish, birds and animals intended for distribution or propagation. The authorities of the Boston & Maine Railroad were especially courteous to Deputy A. M. Nichols, stopping two trains at stations so as to allow him to look after a deer which had been hit by a train, and to attend court on the same day, which he otherwise might not have been able to do.

Mr. O. T. Olsen of Grimsby, Eng., has furnished us with important information about the management of an otter trawl; also illustrations of an otter or trawl board, and a plan of a trawl, which are printed again in this report, on account of the interest in and value of the otter trawl.

On June 9 the Commissioners of Inland Fisheries of Rhode Island courteously invited the Massachusetts Commissioners on Fisheries and Game to visit Rhode Island and inspect the lobster and clam propagation laboratories at Wickford, R. I., conducted by the Rhode Island Commission under the immediate direction of Dr. A. D. Mead. This invitation was accepted by our late chairman, Capt. J. W. Collins, and by Dr. George W. Field, who was then biologist to our commission.

Practically the entire day was spent in the company of the Rhode Island Commission of Fisheries and their distinguished guests from all sections of Rhode Island, including His Excellency Governor Garvin and staff, in inspecting and studying the methods and results of the investigations upon the artificial

propagation of clams and lobsters. Methods have been devised by Dr. H. C. Bumpus and by his successor, Dr. A. D. Mead, which have placed the artificial propagation of clams and lobsters beyond the experimental stage. These methods, with very slight modifications, can and should be applied immediately to Massachusetts shores and waters. For this reason the observations made by us on that day may be of great value to Massachusetts. The bountiful hospitality of the Rhode Island officials was characteristic, and was thoroughly appreciated.

The commission is indebted to Hon. E. P. Whitney for courtesies in driving our late chairman through the Blue Hill Reservation, with the special object of examining certain of the ponds therein situated.

We are indebted to Capt. Robert E. Conwell of Provincetown for courtesies extended by him to our late chairman in the matter of furnishing a power launch, line, bait, etc., for trolling for horse mackerel off Provincetown and Truro.

The following, from the Cape Ann "News" of Jan. 16, refers to the two elegant vases received from the Japanese government by our late chairman, as a token of the appreciation of his efforts in furthering the interests of the fishery industries: —

Much to his surprise and delight, Captain Collins, chairman of the Massachusetts Fish and Game Commission, has received recognition from the Japanese government for helping the students who visited this locality two years ago to observe the American method of fishing and curing. Two Cloisonne vases, representing an art in which the Japanese excel, have been sent to him from the Imperial Fisheries Bureau at Tokio, with notes explaining the gift.

Japan's interest in the fishing industry is natural, inasmuch as there are probably more than 2,500,000 fishermen in the country, and about 4,000 boats engaged in the industry.

The commission has been privileged to extend courtesies in the following instances: —

To the United States Bureau of Fisheries, permitting the collection of egg-bearing lobsters; the operation of two pound nets for scientific purposes, etc.

We have continued to assist Prof. W. E. Castle of Harvard University in securing and holding in confinement material

necessary for the conduct of special scientific researches. The following letter was received while the report was in press:—

CAMBRIDGE, MASS., March 6, 1905.

DR. GEORGE W. FIELD, *Chairman, Commission on Fisheries and Game, State House, Boston, Mass.*

DEAR SIR:—I wish to make grateful acknowledgment of the excellent facilities afforded me during 1904 by the department of fisheries and game for a continued study of certain problems in heredity among brook trout. With the valuable assistance of Mr. Arthur Merrill, the superintendent of the Sutton hatchery, I was enabled to carry these studies through two successive generations of trout. The results obtained, it is hoped, will soon be ready for publication. The good management of the officers of the department made it possible to carry out these experiments without interfering in any way with the regular work of the hatchery, or incurring any additional expense. An investigation of considerable scientific interest was thus successfully executed, one which was necessarily time-consuming, and would have been expensive had it not been possible, through the cordial spirit of co-operation shown by your department, to utilize facilities already in operation in the practical work of fish hatching.

I am indebted to your department also for supplying me with two wild "cotton-tail" rabbits, with which to institute experiments in hybridization with the European rabbit. The results of these experiments are thus far negative.

Yours very truly,

W. E. CASTLE,
*Assistant Professor of Zoölogy,
Harvard University.*

Through our late chairman, we had pleasure in extending courtesies to Prof. H. Henking of Hannover, Germany, Secretary-General of the German Sea Fisheries Association, and Mr. Heidrich of Memel, Germany, Royal High Fish Master, who, in consequence of the publication of extensive extracts with illustrations from our annual report of 1902, were sent to this country by the German government to study the fisheries of Massachusetts, with special reference to the extensive utilization of naphtha fishing boats.

We were also privileged to supply to Hon. Chr. Ravn, Consul-General of Sweden and Norway at New York, certain information regarding fishing craft which was required in Norway.

The commission had pleasure in supplying the Italian government, through its consulate in Boston, with certain publications and other information regarding the fisheries of this State.

One hundred brook trout fry, five hundred eggs and twenty-five fry of the rainbow trout, the latter with sacs attached, and one three-year-old brook trout, were given to Mt. Holyoke College for the students to use in their scientific studies.

Permission was given to Mr. Thomas S. Holmes, 9 South Broadway, Lawrence, Mass., to collect sea lampreys as material for scientific study for Prof. Raymond Pearl, instructor in zoölogy, University of Michigan, Ann Arbor, Mich.

Permits have been issued to the following parties to collect birds and eggs for scientific purposes: Homer L. Bigelow, Boston; John W. Bailey, Boston; Dr. C. F. Hodge, Worcester; J. B. Richards, Fall River; Albert E. Jewett, Clinton; Robert O. Morris, Springfield; A. C. Bent, Taunton; Geo. H. Mackay, Nantucket; Alfred E. Preble, Wilmington; Fred H. Kennard, Boston; F. B. McKechnie, Boston; Owen Durfee, Fall River; John H. Hardy, Jr., Boston; Chas. R. Harte, Jamaica Plain; Ira T. Ward, Sherborn; Fred H. Scott, Westfield; L. C. Jones, Malden; F. E. Waterman, Fall River; Frank S. Aiken, Fall River; Chester A. Reed, Worcester; James P. Porter, Worcester.

Permits to take sand eels for bait have been issued to the following: Paul Jones Lowell, Joseph Thurlow, William H. Simmons, Richard E. Pierce, Samuel P. Dow, E. L. Perkins, Chas. F. Lattime and Albion P. Hilton of Newburyport; Robert J. Sweeney and John F. Sweeney of Salisbury; C. A. Leet, S. W. Caswell, H. T. Mackinney, Edward E. Wells and James E. Carter of Ipswich.

In addition to the permits furnished to Superintendents Corliss and Locke of the United States Fisheries Bureau, permits to collect and hold in confinement egg-bearing lobsters have been given to the following: Allen B. Robinson, Bay View; Chris Nelson, Beverly; Thomas Neville, Beverly Farms; F. C. Leonard and Albert A. Nightingale, Bourne-dale; Julius E. White, H. W. Tolman and Henry Hewins, Brant Rock; Wright & Willis, John G. Cox & Co., Massachusetts Lobster Company, Joseph P. Serrilla, Manuel Surella,

Frank Rosa, John Sandstrom, Manuel Rosa, Jule Rose, Antonio Silva, Christopher Costa, John Pinto and Frank Brenzola, Boston; J. K. Ferreira, East Boston; George W. Bloomer, Chatham; Antone Grassie, John Eltmann, M. S. Thomas, Manuel E. Salvatore, Levi Cadose, O. H. Reamy, Manuel Oliver, Antoine Figueriedo, O. Hanson, R. Ainslie and Charles Anderson, Cohasset; F. E. Wardsworth, South Duxbury; William L. Grew, North Falmouth; Alvin F. Bourne, West Falmouth; Melvin Parsons and Peter Knutson, Gloucester; Daniel Souther, Ambrose Mitchell and R. M. Cleverly, Hull; Frank C. Chandler, Island Creek; R. C. Hiller, Geo. K. Hanson, Jr., R. T. Millett, E. T. Phillips, J. I. Phillips, Frank Dennis and Clarence K. Stone, Marblehead; Daniel B. Gould, East Orleans; Charles S. Brown and John A. Dunn, Salem Willows; Charles H. Parker, Sandwich; J. Frank Cushman and Thomas S. S. Turner, Scituate; C. H. Pratt, North Scituate; Hon. E. L. Bonney, Scituate harbor; Joseph Safrine, Spectacle Island; C. H. Collins, North Truro; W. W. Freeman, South Truro; A. H. Vedeler, Woods Hole; F. J. Cain, North Weymouth.

On Dec. 9, 1904, our respected colleague, Capt. Joseph W. Collins, passed away, after a very brief illness from pneumonia complicated with Bright's disease.

In October, 1899, Captain Collins returned, as chairman of this commission, to Massachusetts, his port of hail during his early manhood. Under his able direction the work of this commission prospered. His personality endeared him to all those associated with him as commissioners and deputies. The following resolutions, passed by the present Board, are a sincere expression of the esteem of those with whom he had been intimately associated for the past five years: —

Whereas, God, in his infinite wisdom, has removed from the councils of this Board our esteemed colleague, Hon. Joseph W. Collins, who for the past five years has so remarkably advanced the scope and value of the work of the commission, and whose reputation extends far beyond the confines of this Commonwealth and the United States; and

Whereas, The passing away of our colleague has taken from this Board one of broad experience and a wise counsellor, whose loss falls not alone upon us personally, but upon the Commonwealth and the nation, therefore —

Be it resolved, That, while bowing reverently to the will of God, the undersigned members of the Massachusetts Commission on Fisheries and Game deeply deplore the loss that has come to them in the death of their honored chairman, and that they extend to Mrs. Collins and other members of the family their most heartfelt sympathy.

Resolved, That these resolutions be spread upon the records of this commission, and a copy thereof be sent to the widow of our late colleague.

GEORGE W. FIELD.

E. A. BRACKETT.

JOHN W. DELANO.

Joseph William Collins was born at Islesboro, Me., Aug. 8, 1839; son of David, Jr., and Eliza (Sawyer), grandson of David and Elizabeth (Barter), and great-grandson of John Collins, who was born at Castine, Me., about 1765. He was brought up a fisher boy, and had few educational advantages. At the age of ten he went to sea on a fishing craft, and there began to gain the general knowledge that fitted him for his life work.

His tenth birthday was spent at sea, on board a fishing vessel. His early education was obtained at a country school during the winter. He took up the study of mathematics and the higher English branches later, while on shipboard. He was appointed to the command of a fishing vessel before he reached his majority, and for many years was master of some of the finest schooners out of Gloucester, Mass.

In 1879 Captain Collins's practical knowledge of the economic aspects of the fisheries and his interest in the scientific study of the inhabitants of the sea attracted the attention of Prof. Spencer F. Baird, at that time the great pioneer scientist of the United States fisheries industries; and through the interest of Professor Baird he actively entered the service of the United States, being employed by the United States Fish Commission to make a statistical report upon the New England fisheries for the tenth census. This was an important task, for then, as now, the New England fisheries were the most important in the United States.

In the spring of 1880 he was sent by the government, on the staff of the United States Commissioner, to the International Fisheries Exposition at Berlin. In December, 1880, he returned to Washington, and resumed work on the preparation of those masterly reports which were published by the United States Fish Commission in the volumes covering "The Fisheries and Fishing Industries of the United States."

He rapidly attained distinction as a writer in this line, and also exhibited great facility in preparing models and illustrations of fishing craft and fishing scenes, the details of which were thoroughly familiar to him. In 1883 he was one of the commission sent by the United States to represent this country and to make a display of its fisheries and fishery resources at the great International Fisheries Exposition held at London in that year. The intimate knowledge of the fisheries and their needs which Captain Collins possessed made it possible for him to offer many important suggestions for their improvement, — suggestions which have been adopted, to the great profit of those industries. The marked change, in recent years, in the fishing vessels of New England, whereby their speed and sea-going qualities have been materially enhanced, and the winter fisheries divested of much of the horror that formerly characterized them, is due to his efforts. In 1886 he put his ideas to practical use in designing the schooner "Grampus" for the United States Fish Commission. This vessel was the pioneer of a new type. Her advent, added to the previous writings by her designer, had a great influence. The "Grampus" is considered one of the most seaworthy vessels afloat. Captain Collins was in command of the "Grampus" from 1886 to 1888.

He made many cruises of investigation on the vessels of the United States Fish Commission, the results of which have appeared in numerous papers, printed in the reports and bulletins of the commission. In 1887, while on a cruise of observation to Newfoundland, Labrador and the Gulf of St. Lawrence, he obtained a large collection of the remains of the great auk (*Plautus impennis*), more bones of this extinct species being procured than were previously possessed by all the museums of the world. In the winter of 1887-88 he was called to Washington for consultation by the Federal International Com-

mission, which was then negotiating the fishery treaty with Canada, and was of much assistance to the American commissioners. In 1888 he was appointed in charge of the division of fisheries of the United States Fish Commission. In the same year he was in charge of the Fish Commission's exhibit at Cincinnati. In 1884 Captain Collins organized, in the United States National Museum, the section of naval architecture, and from that date he was its honorary curator. The collection of models, pictures, photographs, etc., was brought together by him. A large percentage of the models, including those of the "Mayflower" of the Pilgrims, and Capt. John Smith's ship "Sally Constant," were constructed under his personal supervision, and some are from his own designs. In 1893 he was appointed curator of the section of fisheries, and for a short time in 1889 was special agent of the eleventh census, in charge of the section of fisheries, but on account of the pressure of other duties resigned that position. In 1890 he was appointed by President Harrison as the representative of the United States Fish Commission on the Government Board of Management and Control at the World's Columbian Exposition, and was chief of the department of fisheries from February, 1891, to the close of the exposition; but after completing the preparation of the commission's exhibit, which was installed in the government building, he resigned this position and his connection with the Fish Commission in December, 1892.

Captain Collins was a prolific writer on matters relating to the commercial fisheries, and may appropriately be styled the historian of American fisheries. In addition to the various papers and reports which he has published under the auspices of the government, Captain Collins was a frequent contributor to newspapers and magazines. He was one of the contributors to the "Century Dictionary," and during the progress of the World's Fair at Chicago was a member of the staff of the "Fishing Gazette," assuming the duties of editor-in-chief. He was United States Commissioner to the International Fisheries Exhibition at Bergen, Norway, in 1898.

Probably no one man ever connected with the fishing industry was so widely known and so universally esteemed as Captain

Collins. Many of the practical ideas introduced by him into the routine work of the United States Fish Commission and of the Massachusetts department of fisheries and game have proved invaluable. Some of them are in use at this time, and show their worth by the results obtained.

Captain Collins deserves a high place among the notable benefactors of the human race for the results of his life work. He contributed more than any one man to making the deep-sea fishing industry less hazardous to life and property. The following paragraph, written by him in 1882, gives a statement of his greatest life purpose and interest: —

Every fisherman who goes forth to brave the perils of the deep, whose success and life itself depend upon the merit of his vessel, should be well informed in regard to which is the safest model and the best rig; every woman, patiently and hopefully watching for the return from sea of those she loves, should at least have the consolation of knowing that those she waits for have sailed in the *very best* vessel that human skill can devise; every merchant who sends his fleet to sea should feel that everything has been done which can be done to relieve him of the enormous burden of insurance, which for years has so handicapped the Gloucester fisheries. If what I have written has any influence in bringing about a result so much to be wished for, then I shall be amply repaid for my labor.

The success of the vessels constructed on the type of his models was actual and not theoretical. The direct result was the loss of fewer vessels. More than that, the greater speed of the vessels made possible a greater earning capacity for the labor and capital involved in the enterprise. Yet further, the application of power (both steam and naphtha) to large fishing vessels, to catboats and to dories, is another great advance in the same direction, and multiplies the productive capacity of the labor and capital applied to the deep-sea fisheries. Even on these lines alone Captain Collins's work was sufficient to enroll his name high on the list of the benefactors of mankind.

Although the great central fact of his life work has led to making the deep-sea fisheries less hazardous to life and property, the subsidiary results of the application of his scientific knowledge to the method of capturing and marketing fish were

no less noteworthy. As the results of his studies in economic biology, he furnished the knowledge which made possible the development of the Pacific halibut fisheries. By Massachusetts capital, by Massachusetts vessels and Massachusetts men and methods Boston now receives most of its fresh halibut supply in refrigerator cars over the Canadian Pacific from Vancouver. This fishery has arisen during the past five years, and is still increasing rapidly. It already yields an annual catch of more than 25,000,000 pounds, at first-hand value of over \$1,000,000.

Captain Collins was earlier largely instrumental in establishing the New England halibut fishery off the coast of Iceland. The utilization of the whiting or silver hake (*Merlucius bilinearis*), a fish taken in large quantities in the pound nets, but formerly considered of no value, is now sold in large quantities, fresh and pickled. He introduced and developed in the United States many and various methods of fishing, such as, for example, the trawl fishery. Among other important services to the fisheries industry, he was instrumental in securing a wider market for American cod livers. He was the first to advocate the use of cod roe in making caviar, to replace sturgeon roe, now rapidly becoming scarce.

He was the promoter of the Convention of Representatives of the Lobster-producing States and of the Maritime Provinces, which met at the State House, Boston, Sept. 23 and 24, 1903, for the purpose of securing better protection of the lobster. Captain Collins presided as chairman, and also prepared the report of the convention, which was printed by the Commonwealth.

He brought to the chairmanship of the Massachusetts department of fisheries and game a knowledge of the practical side of the work, and a capacity for organization which greatly developed the value of this commission in all its branches. He proved to be wise in counsel, a sympathetic friend to those deserving his consideration, and a stern disciplinarian to law-breakers and imposters.


He was made Chevalier of St. Olaf by the Norwegian government, 1898; awarded diploma for invention, Berlin, 1880; two silver medals for invention and diploma for special ser-

vices, London, 1883; special gold medal of honor by German government, 1894; and honor medal, 1893, as "one of the makers of the World's Columbian Exposition."

He was elected an honorary member of various scientific and fisheries societies of Europe and the United States. He came to be recognized as the historian of the American fisheries, and as a fisheries statistician. He edited the "Fishing Gazette," and, in addition to reviews in "Fisheries and Fishery Industries of the United States," he wrote "History of the Tile Fish;" "The Introduction of Gill Nets in the American Cod Fishery;" "The Beam Trawl Fishery of Great Britain;" "Reports on the Fishing Grounds of the Gulf of Mexico;" "Suggestions for Improvements in Fishing Vessels;" "The Construction and Equipment of the Schooner 'Grampus';" "Report on the Cruise of the 'Grampus' to Newfoundland, Labrador and the Gulf of St. Lawrence, in 1889;" "The Fisheries of the Pacific Coast;" "Statistical Review of the Coast Fisheries of the United States for 1887 and 1888;" "Report upon the Fishing Vessels and Boats of the Pacific Coast;" "Notes on the Oyster Fishery of Connecticut;" "Fisheries of the United States;" "Decadence of the New England Deep-sea Fisheries;" "Evolution of the American Fishing Schooner;" and many other papers. The part of this report, up to and including the chapter on the "Deep-sea Fisheries," pages 1-82, was the last work completed. Other chapters were outlined, and notes were left which have been used in its completion. Captain Collins left voluminous notes, which are of much value to this commission, as they mainly pertain to the work of this Board.

Captain Collins cherished an ambition which led him onward to continually higher ideals. He developed and trained, by dint of hard labor and in spite of grinding conditions, a natural capacity for gathering and setting forth in an interesting and valuable manner the details of the fishing industries of the world. He established himself as an acknowledged world authority in his chosen line. His position is well-nigh unique, — at once the father and the historian of the deep-sea fisheries, for the development of which he has done more than any one man in America.

His life on sea and land was beset by storms and sore trials, but through all he maintained the calm dignity of the strong man, confident in his ability to ultimately conquer difficulties. He acquired a character above reproach; an exemplary husband and father; a Christian man; a citizen who trained his capacities, and ever devoted them unflinchingly to the service of the humble as well as of the powerful, to the State and to the nation.



Upon the death of Captain Collins, Mr. Delano became acting chairman. On Dec. 21, 1904, George W. Field, Ph.D., of Sharon, was nominated by Governor Bates; on December 28 this nomination was confirmed by the Council; on Jan. 2, 1905, Dr. Field was elected chairman of the commission.

GEORGE W. FIELD.

EDWARD A. BRACKETT.

JOHN W. DELANO.

APPENDICES.



[A.]

LIST OF COMMISSIONERS.

UNITED STATES BUREAU OF FISHERIES, WASHINGTON, D. C.

George M. Bowers, Commissioner.

Hugh M. Smith, Deputy Commissioner.

Irving H. Dunlap, Chief Clerk.

Barton W. Evermann, Assistant in charge of Division of Inquiry respecting Food Fishes.

John W. Titcomb, Assistant in charge of Division of Fish Culture.

Alvin B. Alexander, Assistant in charge of Division of Statistics and Methods of the Fisheries.

Superintendents of United States Fisheries Stations.

Charles G. Atkins, Craig Brook, East Orland, Me.

E. E. Hahn, Boothbay Harbor, Me.

Waldo F. Hubbard, Nashua, N. H.

E. N. Carter, St. Johnsbury, Vt.

C. G. Corliss, Gloucester, Mass.

E. F. Locke, Woods Hole, Mass.

C. K. Green, Fish Ponds, Washington, D. C.

L. G. Harron (in charge), Bryan's Point, Md.

George A. Seagle, Wytheville, Va.

R. K. Robinson, White Sulphur Springs, W. Va.

Alexander Jones, Erwin, Tenn.

S. G. Worth, Edenton, N. C.

J. J. Stranahan, Cold Spring, Bullochville, Ga.

G. H. H. Moore, Tupelo, Miss.

Livingston Stone, Cape Vincent, N. Y.

S. W. Downing, Put-in-Bay, O.

Frank N. Clark, Northville, Mich.

S. P. Wires, Duluth, Minn.

R. S. Johnson, Manchester, Ia.

Dr. S. P. Bartlett, Quincy, Ill.

H. D. Dean, Neosho, Mo.

M. F. Stapleton, Mammoth Springs, Ark.

John L. Leary, San Marcos, Tex.

De Witt C. Booth, Spearfish, So. Dak.

W. T. Thompson, Leadville, Col.

James A. Henshall, Bozeman, Mont.

H. O'Malley, Baker Lake, Wash.

C. Wallich, Clackmas, Ore.

Giles H. Lambson, Baird and Battle Creek, Cal.

ARIZONA.

Fish and Game.

T. S. Bunch,	Safford.
W. S. Pinney, Secretary,	Phoenix.
Jean Allison,	Jerome.

CALIFORNIA.

H. W. Keller, President,	Santa Monica.
W. W. Van Arsdale,	San Francisco.
W. E. Gerber,	Sacramento.
Charles A. Vogelsang, Chief Deputy,	San Francisco.

COLORADO.

Charles H. Harris,	Denver.
A. A. Gordon, Secretary,	Denver.
T. J. Holland,	Denver.

CONNECTICUT.

George T. Mathewson, President,	Thompsonville.
Robert G. Pike,	Middletown.
E. Hart Geer, Secretary,	Hadlyme.

DELAWARE.

E. G. Shortlinge,	Wilmington.
J. Thomas Lowe,	Little Rock.

FLORIDA.

John Y. Detwiler, President,	New Smyrna.
John G. Ruge, Secretary,	Appalachicola.
Charles R. Walker,	Sanford.

GEORGIA.

A. T. Dallis, Superintendent of Fisheries,	La Grange.
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IDAHO.

William V. Irons,	Hagerman.
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ILLINOIS.

Nathaniel H. Cohen, President,	Urbana.
S. P. Bartlett, Secretary,	Quincy.
Adolph Gartz,	Chicago.

INDIANA.

Z. T. Sweeney,	Columbus.
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IOWA.

Fish and Game Warden.

George A. Lincoln, Cedar Rapids.

KANSAS.

D. Trovin, Pratt.

MAINE.

Inland Fisheries and Game.

L. T. Carleton, Chairman, Winthrop.

Henry O. Stanley, Dixfield.

Edgar E. Ring, Orono.

Sea and Shore Fisheries.

A. R. Nickerson, Boothbay Harbor.

MARYLAND.

Charles F. Brooks, Sandy Springs.

James D. Anderson, Deals Island.

MASSACHUSETTS.

George W. Field, Chairman, Sharon.

Edward A. Brackett, Winchester.

John W. Delano, Marion.

Office, State House, Boston.

MICHIGAN.

F. B. Dickerson, President, Detroit.

C. D. Joslyn, Detroit.

George M. Brown, Saginaw.

Seymour Bowers, Detroit.

George D. Muzzey, Secretary, Detroit.

MINNESOTA.

Game and Fish.

Uri L. Lamprey, President, St. Paul.

W. P. Hill, Fairmount.

D. W. Meeker, Secretary, Moorhead.

H. G. Smith, Winona.

B. F. Fullerton, St. Paul.

MISSOURI.

John W. Revelle, Lutesville.

NEBRASKA.

John H. Mickey, Lincoln.

NEW HAMPSHIRE.

Fish and Game.

Nathaniel Wentworth, Chairman, Hudson Centre.
 W. H. Shurtleff, Lancaster.
 C. B. Clark, Concord.

NEW JERSEY.

Benjamin P. Morris, President, Long Branch.
 R. T. Miller, Camden.
 D. P. McClellan, Morristown.
 P. H. Johnson, Bloomfield.

NEW YORK.

Forest, Fish and Game.

De Witt C. Middleton, Commissioner, Watertown.
 John D. Whish, Secretary, Albany.

OHIO.

Fish and Game.

J. Lyon Rogers, President, Columbus.
 Paul North, Cleveland.
 Duff W. Greene, Dayton.
 Thomas B. Paxton, Cincinnati.
 George W. McCook, Steubenville.
 George C. Blankner, Secretary, Columbus.

OREGON.

Governor, George E. Chamberlain, Salem.
 Secretary of State, F. I. Dunbar, Salem.
 State Treasurer, C. S. Moore, Salem.
 H. G. Van Dusen, Master Fish Warden, Astoria.

PENNSYLVANIA.

Fisheries Commission.

S. B. Stillwell, President, Scranton.
 W. E. Meehan, Secretary, Philadelphia.
 H. C. Demuth, Treasurer, Lancaster.
 John Hamberger, Erie.
 James W. Correll, Easton.

Game Commission.

William M. Kennedy, President, Pittsburg.
 C. K. Sober, Lewisburg.

James H. Worden,	Harrisburg.
William H. Myers,	Williamsport.
Charles B. Penrose,	Philadelphia.
J. O. H. Denney,	Ligonier.
Joseph Kalbfus, Secretary,	Harrisburg.

RHODE ISLAND.

Inland Fisheries.

Henry T. Root,	Providence.
William P. Morton,	Johnston.
J. M. K. Southwick,	Newport.
Charles W. Willard,	Westerly.
Adelbert Roberts,	Woonsocket.
Albert Davis Mead,	Providence.
William H. Boardman,	Central Falls.

Commissioners of Shell Fisheries.

James M. Wright,	Foster.
Herbert N. Gardiner,	Barrington.
Philip H. Wilbour,	Little Compton.
George W. Hoxie,	Charlestown.
John H. Northup,	Warwick.
James C. Collins, Clerk,	North Providence.

Commissioners of Birds.

John N. Flanagan,	Providence.
W. Gordon Reed, 2d,	Warwick.
Edwin R. Lewis,	Westerly.
William H. Thayer,	Bristol.
Alexander O'D. Taylor,	Newport.

UTAH.

John Sharp,	Salt Lake City.
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VERMONT.

H. G. Thomas,	Stowe.
E. A. Davis,	Bethel.

VIRGINIA.

John W. Bowdoin, Chairman,	Bloxom.
Seth F. Miller, Secretary,	Foster.
George B. Keezell,	Keezelltown.
Henry M. Tyler,	Richmond.
Robert J. Camp,	Franklin.

WASHINGTON.

Governor, Henry McBride,	.	.	.	.	.	Olympia.
State Treasurer, C. W. Maynard,	.	.	.	.	.	Olympia.
T. R. Kershaw, Commissioner,	.	.	.	.	.	Whatcom.

WISCONSIN.

Governor, Robert M. LaFollette, ex officio,	.	.	.	.	Madison.
Edwin E. Bryant, President,	.	.	.	.	Madison.
William J. Starr,	.	.	.	.	Eau Claire.
Calvert Spensely, Treasurer,	.	.	.	.	Mineral Point.
James J. Hogan,	.	.	.	.	La Crosse.
Henry D. Smith,	.	.	.	.	Appleton.
Currie G. Bell,	.	.	.	.	Bayfield.
Edward A. Birge, ex officio, Professor of Zoölogy,					
University of Wisconsin, Secretary,	.	.	.	.	Madison.
James Nevin, Superintendent,	Madison.

WYOMING.

D. C. Nowlin, State Game Warden,	Lander.
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DISTRIBUTION OF FOOD FISH.

BROOK TROUT.

Fry distributed from the Sutton Hatchery during the Months of April and May, 1904.

APPLICANT.	Name of Brook.	Town.	Number.
Alfred Read,	Little River,	Westfield,	4,000
L. H. Bowers,	Jacks,	Westfield,	4,000
C. A. Pierce,	Cold Spring,	Westfield,	4,000
W. A. Soper,	Great,	Westfield,	4,000
W. L. Nash,	Mums,	Westfield,	4,000
L. C. Coburn,	Powder Mill,	Westfield,	4,000
H. R. Stiles,	Slab,	Westfield,	4,000
W. E. Clark,	Hollister,	Westfield,	4,000
Robert L. Soper,	Powder's Hollow,	Westfield,	4,000
W. S. Marsh,	Timber Swamp,	Westfield,	4,000
R. K. Andrews,	Great,	Westfield,	4,000
H. T. Snow,	Oak Orchard,	Westfield,	4,000
Murray C. Damon,	Mammoth,	Leominster,	10,000
Murray C. Damon,	Heywards,	Sterling,	5,000
Murray C. Damon,	Chisel,	Lancaster,	5,000
E. T. Cunningham,	Greenbush,	Lancaster,	4,000
Nelson S. True,	Coyote,	Lancaster,	4,000
A. J. Ray,	Moor's,	Westminster,	5,000
J. E. Stewart,	Weir Meadow,	Westminster,	5,000
F. N. Carpenter,	Tophet,	Westminster,	5,000
L. S. Miller,	Warren and Jobe Seaver,	Westminster,	5,000
Charles Grimes,	Taney,	Hubbardston,	4,000
Stewart K. Pierce,	Hasmore,	Hubbardston,	5,000
Charles N. Dyer,	Hubbardston,	Hubbardston,	5,000
B. F. Pierce,	Ragged Hill,	Hubbardston,	5,000
G. H. Flagg,	Hosmer,	Hubbardston,	4,000
L. L. Murdock,	Mason,	Hubbardston,	4,000
M. R. Goddard,	Cole Meadow,	Gardner,	5,000
M. R. Goddard,	Coprus Mines,	Gardner,	5,000
W. H. Frost,	Ellenwood,	Athol,	5,000
W. H. Frost,	Popple Camp,	Athol,	5,000
M. C. Needham,	Parker,	Colebrook,	4,000
M. C. Needham,	Bell,	Barre,	4,000
William R. Spooner,	Paige,	Barre,	4,000
Frank Edwards,	Carney and Ruggles,	Barre,	4,000
C. F. Cowdry,	Cattacowamac,	Fitchburg,	8,000
H. H. Ramsey,	Pool,	New Salem,	4,000
Arthur E. Fitch,	Thayer,	Palmer,	4,000
J. F. Hartnett,	Hartnett,	Palmer,	4,000
J. F. Luman,	Lawlor's,	Palmer,	4,000
A. D. Norcross,	Conant,	Monson,	4,000
C. W. Eggleston,	Snow,	North Brookfield,	8,000
Stearns Crooks,	Mad,	North Brookfield,	8,000
Louis Harness,	Penny,	Brimfield,	4,000
F. N. Lawrence,	Mill,	Brimfield,	4,000
W. M. Brigham,	Stone,	Marlborough,	4,000
H. C. Hudson,	Saw-mill,	Marlborough,	4,000
W. D. Lepper,	Jerico,	Marlborough,	4,000
O. H. Derry,	Clark and Gannett,	Sharon,	5,000
O. H. Derry,	Beaver Hole,	Sharon,	3,000
D. Frank Crane,	Charles Briggs,	Norton,	4,000
C. V. Dudley,	Burt,	Northbridge,	4,000

Fry distributed from the Sutton Hatchery, etc. — Concluded.

APPLICANT.	Name of Brook.	Town.	Number.
M. H. Coffin,	Purgatory,	Northbridge,	4,000
W. L. Taft,	Poor Farm,	Northbridge,	4,000
George L. Gill,	Carpenter,	Northbridge,	4,000
George E. Whitehead, .	McCracken and Hull, .	Millbury,	4,000
George Pogue,	Carroll and George, .	Grafton,	8,000
Horace Adams,	Adams,	Grafton,	4,000
William F. Brown, . . .	Cold Spring,	Grafton,	4,000
William Gillespie, . . .	Despeau,	Grafton,	4,000
T. F. Mathews,	Muddy,	Mendon,	4,000
N. J. Cole,	Cemetery and Taylor, .	South Acton,	10,000
N. J. Cole,	Houghton's,	South Acton,	6,000
C. L. Allen,	Barber,	Worcester,	4,000
Dom Pocal,	Goodell,	Southbridge,	4,000
Walter H. Edgerly, . .	West Meadow,	West Bridgewater, .	4,000
Fred H. Hill,	Sweden,	Attleborough, . . .	4,000
C. H. Laselle,	Burpee,	Sterling,	4,000
C. E. Edwards,	Ford's,	Franklin,	4,000
Murray J. Bowen, . . .	Palmer River,	Rehoboth,	4,000
Fred S. Soule,	High Brook,	Westwood,	4,000
John W. Delano, . . .	Doggett's,	Rochester,	4,000
			331,000

Fry distributed from the Winchester Hatchery during the Months of April and May, 1904.

Charles E. Taylor, . . .	Cutler's,	Woburn,	4,000
L. A. White,	Ames,	Woburn,	4,000
Frank W. Ames,	Keyes,	Woburn,	4,000
C. W. Ames,	Reading,	Woburn,	4,000
George H. Damon, . . .	Lincoln,	Woburn,	4,000
E. E. Wood,	Content,	Billerica,	4,000
D. F. McIntosh,	Vine,	Bedford,	4,000
Edward Payson,	Grassland,	Lexington,	4,000
Frank P. Simonds, . . .	Simonds',	Lexington,	4,000
Abbott S. Mitchell, . .	Brown's,	Lexington,	4,000
H. M. Munroe,	Shaker Glen,	Lexington,	4,000
C. A. Currier,	Vine,	Lexington,	4,000
N. J. Hardy,	Cox,	Winchester,	4,000
George F. Winn,	Beaver,	Belmont,	4,000
A. C. LaBrequé,	Winn,	Belmont,	4,000
E. S. Farmer,	Merriam,	Billerica,	4,000
O. W. Whittemore, . . .	Mill,	Arlington,	4,000
A. S. Harriman,	Read's,	Arlington,	4,000
E. N. Schofield,	Argella,	Groveland,	3,000
A. L. Robinson,	Greendale and Nash, .	Groveland,	6,000
C. P. Abbott,	Morrill,	Groveland,	3,000
Edward N. Eames, . . .	Lubber's,	Wilmington,	4,000
Arthur E. Roberts, . . .	North,	Reading,	3,000
E. A. Harris,	Gould,	Reading,	3,000
Joshua D. Upton, . . .	East,	Reading,	3,000
Alva Morse,	Penn,	Georgetown,	3,000
E. F. Wilder,	Pengree Farm,	Georgetown,	3,000
Frank Shaw,	Blodgett,	Chelmsford,	4,000
Caleb L. Smith,	Blind,	Chelmsford,	4,000
O. F. Files,	Smallpox,	Salisbury,	4,000
Charles A. Lunt,	Tan House,	Rowley,	4,000
E. J. Cate,	Hawk's,	Methuen,	4,000
W. S. Mitchell,	Fuller's,	Middleton,	4,000
A. S. Coffin,	Alewife,	Gloucester,	4,000
B. B. Tirrell,	Old Swamp,	Weymouth,	4,000
S. Nickerson,	Herring,	Chatham,	4,000
Luther Bailey,	Shaving,	Middleborough, . . .	3,500
Henry A. Phillips, . . .	Herring,	Harwich,	3,500
William E. Badger, . . .	Prospect and Hoods, .	Tewksbury,	4,000
M. E. Leahy,	Long,	Randolph,	3,000
W. F. Holmes,	Monatiquot,	Randolph,	3,000
Clifford Poor,	Brandybrow and Snow, .	Haverhill,	6,000
Clifford Poor,	Pearl,	Boxford,	3,000

Fry distributed from the Winchester Hatchery, etc. — Concluded.

APPLICANT.	Name of Brook.	Town.	Number.
Albert W. Lewis, . . .	Noquochoke,	Westport,	3,500
George L. Huntton, . . .	Double,	Dracut,	4,000
J. E. Mills,	Golden Cove,	Chelmsford,	4,000
Frank M. Chase,	Kirby,	Westport,	3,500
Stanley A. Aldrich, . . .	Copicut,	Fall River,	3,500
Dana C. Everett,	Ledge,	Assonet,	3,500
Nathan B. Everett, . . .	Corwell,	Central Village,	3,500
A. H. Gardner,	Shingle Island,	Hicksville,	3,500
George F. McCann,	Mother's,	Freetown,	3,500
M. A. Cummings,	Bread and Cheese,	Westport,	3,500
Samuel Hyde,	Cress,	Fall River,	3,500
			203,500

Fry distributed from the Hadley Hatchery during the Months of April and May, 1904.

J. F. Page,	Dickinson,	Amherst,	5,000
J. L. Page,	Taylor,	Amherst,	5,000
Edward B. Dickinson, . .	Russell,	Sunderland,	5,000
A. F. Bardwell,	Pelham,	Montague,	5,000
T. F. Buckley,	Maple,	South Hadley,	5,000
J. B. Page,	Elmer,	South Hadley,	5,000
S. E. Bliss,	Leaping Well,	South Hadley,	5,000
A. W. Hoffman,	Leaping Well,	South Hadley,	5,000
George Hoffman,	Buttery,	South Hadley,	5,000
F. E. White,	Stony,	South Hadley,	5,000
Charles H. Sawyer, . . .	Broad,	Northampton,	5,000
Samuel Spencer,	Robert's Meadow,	Northampton,	5,000
Thomas Ahearn,	Ahearn,	Sunderland,	5,000
Louis Gaylor,	Parsons,	Easthampton,	5,000
Edward Miller,	Loudville River,	Easthampton,	5,000
Peter McHugh,	Running Gutter,	Hatfield,	5,000
Joseph D. Fountaine, . .	Punch and Bardwell,	Greenfield,	10,000
Joseph D. Fountaine, . .	George Nos. 1 and 2,	Shelburne,	10,000
H. B. Bailey,	Bennett's Meadow,	Greenfield,	5,000
John Robertson,	Morey,	Leyden,	5,000
William A. Barber,	Green,	Leyden,	5,000
Edward J. Brannigan, . .	Newton,	Hardwick,	5,000
E. W. Lawton,	Muddy,	Ware,	5,000
H. N. Fisherick,	Flat,	Ware,	5,000
Dennis F. Shea,	Elwell,	Hardwick,	5,000
F. E. Hawkes,	Rogers,	Goshen,	5,000
W. A. Smith,	Packard,	Goshen,	5,000
John Doherty,	Highland,	Goshen,	5,000
J. J. Driscoll,	Williamansett,	Chicopee,	5,000
M. H. Walsh,	Cooley,	Chicopee,	5,000
A. F. Dubuque,	Fuller,	Chicopee,	5,000
J. R. Beaudoin,	Poor,	Chicopee,	5,000
Joel Martin,	Black and Gibbs,	Blandford,*	10,000
Enos W. Boise,	Potash and Freeland,	Russell,*	5,000
George W. Fowler,	Kenney,	Chester,*	5,000
William H. Fowler,	Skunk,	Chester,*	5,000
George A. Smith,	Wardlot,	Chester,*	5,000
H. E. Day,	Dry,	Chester,*	5,000
A. F. Pierce,	Day,	Chester,*	5,000
			210,000

* The Blandford, Russell and Chester lots were all brown trout.

Fry distributed from the Adams Hatchery during the Months of April and May, 1904.

APPLICANT.	Name of Brook.	Town.	Number.
William A. Burns, . . .	Yokum,	Richmond, . . .	5,000
William K. Henry, . . .	Unchamett,	Pittsfield, . . .	5,000
William K. Henry, . . .	Brattle and Sackett,	Pittsfield, . . .	10,000
James M. Burns, . . .	Yokum,	Lenox,	5,000
H. W. Larabee,	Cold River,	Florida,	5,000
Edward H. Pratt, . . .	Sherman and Tunnel,	North Adams, . .	10,000
Edward H. Pratt, . . .	McNamara,	North Adams, . .	5,000
S. G. Tenney,	Sweet,	Williamstown, . .	10,000
Willard E. Hoyt, . . .	Buxton,	Williamstown, . .	10,000
W. S. Gabb,	Clark, Cole and Shaw,	Cummington, . . .	15,000
W. S. Gabb,	Crosby and Buxton,	Cummington, . . .	10,000
W. S. Hathaway, . . .	Starks,	Savoy,	5,000
L. H. Randall,	Drowned Land,	Savoy,	5,000
F. H. Pierce,	Pierce and Torrey,	Windsor,	10,000
F. H. Pierce,	Steep Bank,	Windsor,	5,000
E. L. Bird,	Hollis,	Windsor,	5,000
W. M. Niles,	Bozrah,	Charlemont, . . .	5,000
L. J. Hall,	Rice,	Charlemont, . . .	5,000
C. I. Leslie,	Benton,	Otis,	5,000
F. W. Whitlock,	Clam,	Sandisfield, . . .	5,000
Edgar R. Gillett, . . .	Read,	Heath,	5,000
A. E. Sumner,	Underwood,	Heath,	5,000
Francis O'Neill,	Tophet, Miller and Dry,	Adams,	15,000
Francis O'Neill,	Fisk and Bassett,	Adams,	10,000
George F. Sayles,	Dry,	Adams,	5,000
William P. Martin, . . .	Mark Jenks,	Cheshire,	5,000
H. B. Burdick,	McDonald,	Cheshire,	5,000
F. L. Snow,	Whitford Rock,	Cheshire,	5,000
C. H. Sage,	Konkapot,	Great Barrington, .	10,000
L. B. Moore,	Hop,	Tyringham, . . .	5,000
			210,000

Fingerling Brook Trout Plants.

Charles Grimes,	Cook,	Hubbardston, . . .	200
Henry H. Hollock, . . .	Tanyard,	Hubbardston, . . .	200
G. H. Flagg,	Hosmer,	Hubbardston, . . .	200
A. C. Murdock,	Mason,	Hubbardston, . . .	200
Geo. F. Parsons,	Natty,	Hubbardston, . . .	200
C. L. Allen,	Weasel,	Worcester,	200
John F. Daniels,	Nigger and Streeter,	Paxton,	200
Frank L. Pike,	Richardson Stevens,	Charlton,	200
C. F. Cowdry,	Mulpus,	Fitchburg,	200
Dom Pocal,	Walker,	Southbridge, . . .	200
Joseph P. Love,	Potash and Freeman,	Webster,	400
W. L. Taft,	Poor Farm,	Northbridge, . . .	200
Geo. L. Gill,	Daniel Day,	Northbridge, . . .	200
C. V. Dudley,	Prentiss,	Northbridge, . . .	200
M. H. Coffin,	Prentiss,	Northbridge, . . .	200
Michael J. Shea,	South Street,	Warren,	200
A. E. Snow,	Howe,	Spencer,	200
A. D. Putnam,	Newell,	Spencer,	200
J. S. Ames,	Lovewells,	Hubbardston, . . .	200
Chas. A. Brown,	Ragged Hill,	Hubbardston, . . .	200
A. W. Pratt,	Bailey,	Gardner,	200
Myron R. Goddard, . . .	Hubbardston,	Gardner,	200
L. J. McKnight,	French,	Templeton,	200
F. J. Pierce,	Reed,	Gardner,	200
Allen G. Buttrick, . . .	Four Pairs,	Lancaster,	200
E. T. Cunningham, . . .	Greenbush,	Lancaster,	200
Nelson S. True,	Coyote,	Lancaster,	200
Geo. W. Cook,	Mullet,	Barre,	200
J. F. Barrett,	Paige,	Barre,	200
John S. Rice,	Paige and Prince,	Barre,	400
William F. Brown,	Cold Spring,	Grafton,	200
George Pogue,	George and Carroll,	Grafton,	400
William Gillispie,	Despeau,	Grafton,	200
Charles Adams,	Misco,	Grafton,	200
Horace Adams,	Adams,	Grafton,	200
C. S. Howe,	Whiting,	North Brookfield, .	200

Fingerling Brook Trout Plants—Continued.

APPLICANT.	Name of Brook.	Town.	Number.
Ernest D. Corbin,	Town Farm,	North Brookfield, . .	200
C. L. Bush,	Mad,	North Brookfield, . .	200
Stevens Crooks,	Mad,	North Brookfield, . .	200
G. W. Cowles,	Kent Meadow,	West Brookfield, . .	200
C. E. Bills,	White,	West Brookfield, . .	200
J. B. Hoskins,	Budish,	West Brookfield, . .	200
C. H. Clark,	Allen,	West Brookfield, . .	200
J. G. S. Mackley,	Pierce,	West Brookfield, . .	200
C. H. Lasselle,	Osgood,	Lancaster,	200
Geo. F. Prevear,	Heyward,	Lunenburg,	300
Geo. F. Prevear,	Fort Pond,	Shirley,	300
Geo. F. Prevear,	Massapoag,	Shirley,	400
M. C. Wood,	Sampson,	Ware,	200
W. G. Rotherham,	Drake,	Ashfield,	200
H. J. Sawyer,	Apple Valley,	Ashfield,	200
J. M. Higgs,	Bear River,	Conway,	200
Frederick Spencer,	Clark,	Buckland,	200
J. S. Outhouse,	Avery,	Charlemont,	200
John F. Hood,	Fall River,	Gill,	200
O. W. Wright,	Branch of Swift River, .	New Salem,	200
Chas. H. Robertson, . . .	Hibbard,	Leyden,	200
R. A. Atherton,	Fall River,	Bernardston,	200
C. E. Bass,	Mount Grace,	Warwick,	200
C. H. Russell,	Thatcher,	Greenfield,	200
Michael Silva,	Wacona Falls,	Dalton,	} 1,200
Henry A. Barton,	Benton,	Dalton,	
P. H. Clarrisey,	Cady,	Dalton,	
Wm. H. Carey,	Cleveland,	Dalton,	
F. N. Groesbeck,	Benton,	Dalton,	
E. W. Stockwell,	Umpacheenee,	New Marlborough, . .	200
J. S. Moore,	Bliss,	West Stockbridge, . .	200
Frank C. Backus,	Shaker,	Hancock,	200
J. E. Morgan,	Jaeschke,	Adams,	200
F. W. Whitlock,	Green River,	Great Barrington, . .	200
C. J. Leslie,	Green River,	Great Barrington, . .	200
H. S. Dean,	Peggy,	Great Barrington, . .	200
Geo. D. Gregory,	Smith,	Sandisfield,	200
H. S. Manley,	Moreley,	Sandisfield,	200
F. M. Smith,	Bachelor,	South Hadley,	400
F. E. White,	Leaping Well,	South Hadley,	200
A. W. Hoffman,	Stony,	South Hadley,	200
S. S. Bliss,	Goepel,	South Hadley,	200
Geo. Hoffman,	Kellogg,	South Hadley,	200
E. B. Dickenson,	Taylor,	Amherst,	200
J. F. Page,	East Street,	Amherst,	200
C. F. Branch,	Russell,	Amherst,	200
T. S. Page,	Dickenson,	Amherst,	200
C. L. Lyman,	Moose,	Southampton,	200
M. L. Sornborger,	Joe Wright,	Williamsburg,	200
Geo. F. Pearson,	Black,	Lowell,	200
Albert A. Smith,	Golden Cove,	Chelmsford,	200
Caleb L. Smith,	Blind,	Chelmsford,	200
H. W. Boynton,	McClures,	Chelmsford,	200
Wm. A. Lang,	Wright,	Chelmsford,	200
Chas. M. Griffin,	Great,	Westford,	200
F. A. Griffin,	Mine,	Westford,	200
Geo. W. Olcott,	Woods,	Billerica,	200
C. N. Hargraves,	Rattlesnake,	South Framingham, . .	200
F. R. Newton,	Bowditch,	South Framingham, . .	200
F. E. Barrett,	Baiting,	South Framingham, . .	200
H. P. Andrews,	Hog,	Hudson,	200
Wm. Whitmore,	Cherry,	Weston,	200
Frank L. Blood,	Baddacook,	Groton,	200
H. C. Wheeler,	Virginia Road,	Concord,	200
J. F. Piper,	Pearl Hill,	Townsend,	200
J. F. Piper,	Barberry and Bixby, . .	Townsend,	200
W. A. Kemp,	Nokes,	Pepperell,	200
Chas. M. Kimball,	Taylors,	South Acton,	400
D. L. Ball,	Second Division, . . .	Concord Junction, . .	200
W. S. Sheldon,	Trap Falls,	Ashby,	200
Louis Harness,	Penney,	West Brimfield, . . .	200
F. N. Lawrence,	Mill,	West Brimfield, . . .	200
A. D. Norcross,	Conant,	Wales,	200
A. D. Norcross,	Conant,	Monson,	200
A. D. Norcross,	Toby,	Monson,	200
John F. Luman,	Laulors,	Palmer,	200

Fingerling Brook Trout Plants—Concluded.

APPLICANT.	Name of Brook.	Town.	Number.
Arthur E. Fitch, . . .	Thayer,	Palmer,	200
M. H. Walsh,	Cooley,	Chicopee,	400
Jas R. Beaudoin, . . .	Poor,	Chicopee,	200
Robert L. Soper, . . .	Slat,	Westfield,	200
W. A. Soper,	Powder Mill,	Westfield,	200
H. R. Stiles,	Timber Swamp,	Westfield,	200
Alfred Read,	White,	Westfield,	200
W. E. Clark,	Cold Spring,	Westfield,	200
R. K. Hollister,	Hollister,	Westfield,	200
C. A. Pierce,	Mums,	Westfield,	200
H. T. Snow,	Oak Orchard,	Westfield,	200
W. J. Morton,	Jacks,	Westfield,	200
O. T. Files,	Smallpox,	Salisbury,	200
W. F. Holmes,	Nonatiquot,	Randolph,	200
M. E. Leahy,	Norway,	Randolph,	200
J. E. Emerson,	Woodwards,	Franklin,	200
O. H. Derry,	Beaver Hole,	Sharon,	400
N. B. Everett,	Ledge,	Westport,	200
A. W. Lewis,	Noquochoke,	Westport,	200
N. H. Wood,	Tuckers,	Norton,	200
M. J. Bowen,	Branch of Palmer River,	Rehoboth,	200
M. A. Cummings,	Bread and Cheese,	Fall River,	200
W. C. Woodward,	Fall and Shearing,	Middleborough,	500
W. C. Woodward,	Raven and Bennetts,	Middleborough,	500
Stanley Aldrich,	Mothers,	Assonet,	200
Geo. T. Parker,	Acushnet,	Acushnet,	200
Isaac V. Braley,	Keenes,	Acushnet,	200
F. B. Trunchey,	Noanet,	Dover,	200
Chas. F. Pfeiffer,	Clay,	Dover,	200
Geo. H. Sweetman,	Smith,	Bedford,	200
F. M. Carthy,	Hawks,	Methuen,	200
G. W. Piper,	Fosters,	Methuen,	200
David G. Wheelton,	Wheeltons,	Middleton,	200
Clifford Poor,	Pearl,	Boxford,	200
Chas. A. Lunt,	Tanhouse,	Rowley,	200
F. M. Palmer,	Cuba,	North Andover,	200
Abbot S. Coffin,	Alewife,	Gloucester,	200
T. J. Fitzgerald,	Woods,	Andover,	200
C. P. Abbot,	Mill,	Groveland,	200
A. C. Groves,	Mill,	Middlefield,	200
Henry W. Hill,	Blake and Bullard,	Williamsburg,	400
F. L. Bisbee,	Bradford,	Williamsburg,	200
W. H. Thayer,	Farnsworth,	Williamsburg,	400
L. W. Sears,	Hunt,	Hawley,	200
Henry Bassett,	Hartwell,	Charlemont,	200
W. H. Frost,	Brigham,	Orange,	200
F. L. Hager,	North,	Baldwinville,	200
Louis H. Ruggles,	Moose,	Hardwick,	200
Timothy Page,	Powers,	Hardwick,	200
Wm. G. Rice,	Stevens,	Worthington,	400
Chas. H. Sawyer,	Broad,	Northampton,	200
Wm. G. Bassett,	Roberts Meadow,	Northampton,	200
Peter McHugh,	Running Gutter,	Hatfield,	200
Arthur Day,	Lead Mine,	Easthampton,	200
Edward Miller,	Pomeroy,	Easthampton,	200
Philip Langden,	Sandy Hill,	Northampton,	200
Samuel Spencer,	Turkey Hill,	Northampton,	200
Louis F. Gaylor,	Parsons,	Northampton,	200
Chas. A. Foster,	Loudville, west branch,	Westhampton,	200
Wm. H. Carter,	Loudville, east branch,	Westhampton,	200
James Driscoll,	Tyler,	Windsor,	200
F. H. Pierce,	Savoy branch,	Windsor,	200
F. N. Haskins,	Haskins,	Savoy,	200
J. E. Cadagon,	McDonald,	Cheshire,	200
C. H. Sage,	Konkapot,	Great Barrington,	200
Fred H. Miller,	Beechwood,	Hingham,	200
P. M. Woodward,	Black Fly,	Medway,	200
Chas. Cummings,	Woburn,	Woburn,	200
Cyrus Borton,	Black,	Lowell,	200
James J. Driscoll,	Willimansett,	Chicopee,	200
J. F. Hartnett,	Hartnett,	Palmer,	200
Chas. Sugden,	Ludden,	Spencer,	200
Claude A. Tarbox,	Wheeler,	Byfield,	200
Seth Damon,	Mill River,	Weymouth,	200

Ponds restocked, 1904.

NAME OF POND.	Town. .	Brown Trout Fingerlings.	Pike Perch Fry.	Landlocked Smelt Eggs.	Adult Brook Trout.
North,	Orange,	-	300,000	-	-
Forest Lake,	Palmer,	-	300,000	-	130
Round,	Palmer,	-	300,000	-	-
Massapoag,	Groton,	-	300,000	2,000,000	-
Spectacle,	Littleton,	1,000	300,000	2,000,000	-
Fort,	Littleton,	-	300,000	-	-
Quabbin Lake,	Greenwich,	1,000	300,000	2,000,000	-
Laurel Lake,	Lee,	1,000	-	2,000,000	-
White,	Concord,	1,000	-	-	-
Hampton,	Westfield,	1,000	-	-	-
Chaubunagungamaug,	Webster,	-	-	-	112
Pearl Lake,	Wrentham,	1,000	-	-	-
Cranberry,	Spencer,	-	-	2,000,000	-
Rock,	Georgetown,	-	-	2,000,000	-
Neck,	Barnstable,	-	-	4,000,000	-
		6,000	2,100,000	16,000,000	242

Ponds stocked but not closed, 1904.

NAME OF POND.	Town.	Rainbow Trout Fingerlings.	Adult Brook Trout.
Hoosicwhisick,	Blue Hill reservation,	1,000	-
Lake Quinsigamond,	Worcester,	-	95

Ponds stocked and closed in Accordance with Section 19, Chapter 91, Re-vised Laws, 1904.

NAME OF POND.	Town.	Brown Trout Fingerlings.	Rainbow Trout Fingerlings.	Landlocked Salmon Fingerlings.	Pike Perch Fry.
Massapoag,	Sharon,	-	-	-	600,000
Pleasant,	Wenham,	-	-	-	300,000
Long,	Tewksbury,	-	-	-	300,000
Long and Little Long,	Plymouth,	1,000	-	-	300,000
Great,	North Andover,	-	1,000	-	-
Quannapowitt,	Wakefield,	-	1,000	-	-
Packard,	Orange,	-	-	1,200	-
Baddacook,	Groton,	-	1,000	-	-
Forest Lake,	Palmer,	-	1,000	-	-
Sheep,	Brewster,	-	1,000	-	-
Bakers,	Orleans,	1,000	-	-	-
Goose,	Chatham,	1,000	-	-	-
Long,	Freetown,	1,000	-	-	-
Great Herring,	Plymouth,	1,000	-	-	-
Billington Sea,	Plymouth,	-	1,000	-	-
		5,000	6,000	1,200	1,500,000

[C.]

DISTRIBUTION OF PHEASANTS.

Pheasants were liberated in the covers in various sections of the State, as indicated in the following list, which also embraces the names of applicants for birds:—

A. J. Purington,	Palmer.
Dr. Frederick H. Saunders,	Westfield.
A. H. Jefts,	Athol.
Clarence C. Russell,	Greenfield.
Rufus B. Dodge,	Worcester.
Heman S. Cheney,	Southbridge.
E. J. Norman,	Lee.
F. F. Baldwin,	Hopkinton.
F. W. Smith,	South Hadley.
Oliver H. Derry,	Sharon.
E. B. Sherman,	Franklin.
Selectmen,	Bridgewater.
H. H. Gabeler,	Worcester.
C. C. Russell,	Greenfield.
C. F. Cowdrey,	Fitchburg.
S. G. Poole,	Gloucester.
C. M. Kimball,	South Acton.
William Trautman,	Ballardvale.
Edward Joyce,	Lawrence.
Louis P. Howe,	Marlborough.
Hon. G. H. Doty,	Waltham.
Hon. Sanborn G. Tenney,	Williamstown.
John M. Van Huyck,	North Adams.
F. S. Stockwell,	Millbury.
A. D. Barnes,	Southbridge.
Chas. M. Kimball,	South Acton.
Henry P. Andrews,	Hudson.
Ernest N. Schofield,	Groveland.
F. C. Johnson,	East Saugus.
Thomas Williams,	Attleborough.
Henry M. Knowles,	New Bedford.
S. M. Fuller,	Rock.
W. F. Holmes, M.D.,	Randolph.

Walter H. Edgerly,	.	.	.	.	.	.	Bridgewater.
J. M. Burke,	.	.	.	.	.	.	Provincetown.
C. F. Lynch,	.	.	.	.	.	.	Lawrence.
Bernard J. Callahan,	.	.	.	.	.	.	Lowell.
James E. Burns,	.	.	.	.	.	.	Lowell. ¹
Franklin S. Stockwell,	.	.	.	.	.	.	West Millbury.
Henry L. Crane,	.	.	.	.	.	.	Bridgewater.
Fred S. Lufkin,	.	.	.	.	.	.	Gloucester.
W. H. Reynolds,	.	.	.	.	.	.	Braintree.

[D.]

DISTRIBUTION OF BELGIAN HARES.

A. J. Purington,	.	.	.	.	.	Palmer.
Andrew Bryson,	.	.	.	.	.	Ware.
James F. Scott,	.	.	.	.	.	Ballardvale.
Edward Miller,	.	.	.	.	.	Northampton.
F. M. Smith,	.	.	.	.	.	South Hadley Falls.
C. M. Pettingill,	.	.	.	.	.	Cummington.
Leo Clark,	.	.	.	.	.	Millville.
P. A. Dowd,	.	.	.	.	.	Worcester.
F. H. Saunders,	.	.	.	.	.	Westfield.
W. H. Frost,	.	.	.	.	.	Athol.
E. B. Sherman,	.	.	.	.	.	Franklin.
Oliver H. Derry,	.	.	.	.	.	Sharon.
W. H. Reynolds,	.	.	.	.	.	Braintree.
Edward Shattuck,	.	.	.	.	.	Andover.
Thomas Le Sueur,	.	.	.	.	.	Gloucester.
Ezra O. Bradford,	.	.	.	.	.	Athol.
Thomas B. Rounds,	.	.	.	.	.	Somerset.
Fred H. Hill,	.	.	.	.	.	Attleborough.
F. C. Johnson,	.	.	.	.	.	East Saugus.
Henry M. Knowles,	.	.	.	.	.	New Bedford.
James M. Burke,	.	.	.	.	.	Provincetown.
Hon. Sanborn G. Tenney,	.	.	.	.	.	Williamstown.
Edwin C. Hotchkiss,	.	.	.	.	.	Gloucester.
Charles M. Kimball,	.	.	.	.	.	South Acton.
Edward Miller,	.	.	.	.	.	Northampton.
A. H. Jefts,	.	.	.	.	.	Athol.
Leo Clark,	.	.	.	.	.	Millville.
F. H. Saunders,	.	.	.	.	.	Westfield.
Edward W. Hunt,	.	.	.	.	.	Weymouth.
E. H. Morse,	.	.	.	.	.	Petersham.
W. N. Frost,	.	.	.	.	.	Athol.

[E.]

ARRESTS AND CONVICTIONS.

Report upon Convictions, Fines, etc., for Violations of Fish and Game Laws.

STATE v. —	TOWN OR CITY.	Offence.	Court Decision.	Fine.
Averiste Lasone, .	Fall River, .	Sunday hunting, .	Discharged, .	—
Jas. S. A. Valler, .	Plymouth, .	Owning dog that chased deer, .	Convicted, .	\$20 00
Miles Pilkington, .	Billerica, .	Fishing closed brook, .	Convicted, .	20 00
Frerer A. Dean, .	Wrentham, .	Fishing closed brook, .	Convicted, .	Filed.
Charles Parker, .	Wrentham, .	Fishing closed pond, .	Convicted, .	Filed.
Robert Monroe, .	Wrentham, .	Fishing closed pond, .	Convicted, .	Filed.
Joseph Bacon, .	Wrentham, .	Fishing closed pond, .	Convicted, .	Filed.
Geo E. Phillips, .	New Bedford, .	Short lobsters, .	Convicted, .	15 00
Oscar Mailhot*, .	Big Island, Swansea, .	Illegal possession of black ducks, .	Convicted, .	60 00
Charles Letendre, .	Bowenville, .	Illegal possession of black ducks, .	Discharged, .	—
John A. Taber, .	New Bedford, .	Short lobsters, .	Convicted, .	30 00
William A. Read, .	Fall River, .	Setting fish trap without permit, .	Convicted, .	Filed.
Benjamin Rodgers, .	Byfield, .	Illegal smelt fishing, .	Convicted, .	4 00
Horace Kimball, .	Haverhill, .	Having two short trout, .	Convicted for one; not prossed the other, .	10 00
Everett L. Small, .	Gloucester, .	Short lobsters, .	Convicted, .	25 00
Joseph Slade, .	Manchester, .	Short lobsters, .	Convicted, .	78 00

* Appealed; discharged in superior court.

Report upon Convictions, Fines, etc., for Violations of Fish and Game Laws — Continued.

STATE v. —	TOWN OR CITY.	Offence.	Court Decision.	Fine.
Charles Fellows, . . .	Salem, . . .	Short lobsters, . . .	Convicted, . . .	\$25 00
Leopold Vieira, . . .	Gloucester, . . .	Short lobsters, . . .	Convicted, . . .	24 00
John H. Montgomery, . . .	Swampscott, . . .	Short lobsters, . . .	Convicted, . . .	15 00
Alfred S. Cooper, . . .	Beverly, . . .	Assaulting officer, . . .	Convicted, . . .	15 00
Wm. L. Lantz, . . .	Beverly, . . .	Assaulting officer, . . .	Convicted, . . .	15 00
Francis J. Crowell,* . . .	Beverly, . . .	Refusing to assist officer, . . .	Convicted, . . .	20 00
Fred Mullens, . . .	Newburyport, . . .	Hunting on the Lord's day, . . .	Convicted, . . .	10 00
Daniel Kelley,† . . .	Newburyport, . . .	Hunting on the Lord's day, . . .	Convicted, . . .	—
Edward J. Kenney,† . . .	Newburyport, . . .	Hunting on the Lord's day, . . .	Complaint not allowed, . . .	—
Joseph Huber, . . .	Dedham, . . .	Hunting on the Lord's day; having gray squirrel in possession, . . .	Complaint not allowed, . . .	—
Herman Voight, . . .	Dedham, . . .	Hunting on the Lord's day, . . .	Convicted, . . .	10 00
William Koch, . . .	Dedham, . . .	Hunting on the Lord's day; hunting with ferret, . . .	Convicted, . . .	Filed.
Aloyse Glasser, . . .	Dedham, . . .	Hunting on the Lord's day, . . .	Convicted, . . .	10 00
Edward H. Nutter, . . .	Peabody, . . .	Hunting on the Lord's day, . . .	Convicted, . . .	30 00
Charles K. Reed, . . .	Worcester, . . .	Illegal possession of game, . . .	Discharged, . . .	—
Charles W. Oldrieve, . . .	Chelsea, . . .	Discharging explosives in fishing waters, . . .	Discharged, . . .	—
		four counts, . . .	Filed, two counts; convicted, two counts, . . .	20 00
Arthur Dolphee, . . .	Hubbardston, . . .	Owner of dog found chasing deer, . . .	Discharged, . . .	—
Joseph Dolphee, . . .	Hubbardston, . . .	Owner of dog found chasing deer, . . .	Discharged, . . .	20 00
George Dolphee,† . . .	Hubbardston, . . .	Owner of dog found chasing deer, . . .	Convicted, . . .	Filed.
Henry P. Valonton, . . .	Hubbardston, . . .	Owner of dog that chased deer, . . .	Convicted, . . .	—
Eben Pope, . . .	Hull, . . .	Short lobsters, . . .	Discharged, . . .	10 00
John Monroe, . . .	Beachmont, . . .	Short lobsters, . . .	Convicted, . . .	15 00
Joseph Fouch, . . .	Boston, . . .	429 smelt illegally taken, . . .	Discharged, . . .	—

Frank Costa, . . .	East Boston, . . .	Short and egg-bearing lobsters, . . .	Convicted, . . .	40 00
Hartley Wells, . . .	Winthrop, . . .	Short lobsters, . . .	Convicted, . . .	78 00
Frank Silva, . . .	Boston, . . .	Short lobsters, . . .	Convicted, . . .	44 00
Joseph Rio, . . .	Boston, . . .	Short lobsters, . . .	Convicted, . . .	16 00
Nathan Sampson, . . .	Plymouth, . . .	Hunting on the Lord's day, . . .	Convicted, . . .	10 00
Daniel McQuarrie, . . .	Plymouth, . . .	Hunting on the Lord's day, . . .	Convicted, . . .	10 00
Frank Silver, . . .	Boston, . . .	Short lobsters, . . .	Convicted, . . .	38 00
Antonia Silver, . . .	Boston, . . .	Short lobsters, . . .	Convicted, . . .	45 00
Phillip Cotell, . . .	Dennis, . . .	Short lobsters, . . .	Convicted, . . .	21 00
Peter G. Crehan, . . .	Fall River, . . .	Short lobsters, . . .	Convicted, . . .	20 00
Arthur H. Gibbs, . . .	Bourne, . . .	Short lobsters, . . .	Convicted, . . .	20 00
William H. Dyer, \$. . .	New Bedford, . . .	Taking shellfish in New Bedford, . . .	Convicted, . . .	Filed.
Joseph Depery, \$. . .	New Bedford, . . .	Taking shellfish in New Bedford, . . .	Convicted, . . .	Filed.
Napoleon Jacob, \$. . .	New Bedford, . . .	Taking shellfish in New Bedford, . . .	Convicted, . . .	Filed.
David Laundry, \$. . .	New Bedford, . . .	Taking shellfish in New Bedford, . . .	Convicted, . . .	Filed.
Thomas Malanson, \$. . .	New Bedford, . . .	Taking shellfish in New Bedford, . . .	Convicted, . . .	Filed.
Calyx Breen, \$. . .	New Bedford, . . .	Taking shellfish in New Bedford, . . .	Convicted, . . .	Filed.
Joseph Latont, \$. . .	New Bedford, . . .	Taking shellfish in New Bedford, . . .	Convicted, . . .	Filed.
Philip Beaujoin, \$. . .	New Bedford, . . .	Taking shellfish in New Bedford, . . .	Convicted, . . .	Filed.
Thomas Johnson, \$. . .	Fairhaven, . . .	Taking shellfish in New Bedford, . . .	Convicted, . . .	Filed.
James White, \$. . .	New Bedford, . . .	Taking shellfish in New Bedford, . . .	Convicted, . . .	Filed.
Francis Halgate, \$. . .	Fairhaven, . . .	Taking shellfish in New Bedford, . . .	Convicted, . . .	Filed.
John Richards, \$. . .	New Bedford, . . .	Taking shellfish in New Bedford, . . .	Convicted, . . .	Filed.
Ernest Lodin, \$. . .	New Bedford, . . .	Taking shellfish in New Bedford, . . .	Convicted, . . .	Filed.
Henry P. Coffin, \$. . .	New Bedford, . . .	Taking shellfish in New Bedford, . . .	Convicted, . . .	Filed.
Henry Disshane, \$. . .	New Bedford, . . .	Taking shellfish in New Bedford, . . .	Convicted, . . .	Filed.

* Appealed.

† Complaint not allowed, there being but one gun in the party.

‡ Filed on payment of costs.

§ Guilty in every case, but court showed mercy. The judge told them that if they were found taking any more shellfish illegally they would be fined at least \$50 per man.

Report upon Convictions, Fines, etc., for Violations of Fish and Game Laws — Continued.

STATE v. —	TOWN OR CITY.	Offence.	Court Decision.	Fine.
Levi Burgess,*	New Bedford,	Taking shellfish in New Bedford,	Convicted,	Filed.
Edward Benoit,*	New Bedford,	Taking shellfish in New Bedford,	Convicted,	Filed.
Francis Britin,*	New Bedford,	Taking shellfish in New Bedford,	Convicted,	Filed.
Charles Broadbent,*	New Bedford,	Taking shellfish in New Bedford,	Convicted,	Filed.
Luke Dagan,*	New Bedford,	Taking shellfish in New Bedford,	Convicted,	Filed.
Samuel Dion,*	New Bedford,	Taking shellfish in New Bedford,	Convicted,	Filed.
Louis Dion,*	New Bedford,	Taking shellfish in New Bedford,	Convicted,	Filed.
Napoleon Richards,*	New Bedford,	Taking shellfish in New Bedford,	Convicted,	Filed.
Bozie Pairry,*	New Bedford,	Taking shellfish in New Bedford,	Convicted,	Filed.
Philip Gogan,*	New Bedford,	Taking shellfish in New Bedford,	Convicted,	Filed.
Manuel V. Perry,*	New Bedford,	Taking shellfish in New Bedford,	Convicted,	Filed.
Andrew Olsen,*	New Bedford,	Taking shellfish in New Bedford,	Convicted,	Filed.
Mike Hewitt,*	New Bedford,	Taking shellfish in New Bedford,	Convicted,	Filed.
Walter E. Nickerson,	Woods Hole,	Short lobsters,	Convicted,	\$75 00
William H. Gould,	Chatham,	Hunting on the Lord's day,	Convicted,	10 00
William F. Curtis,	Boston,	Hunting on the Lord's day,	Convicted,	10 00
Leroy S. Isley,	Boston,	Hunting on the Lord's day,	Convicted,	10 00
John C. Heyer,	South Boston,	Hunting on the Lord's day,	Convicted,	10 00
James H. Bradley,†	Concord,	Keeping dogs that chased deer,	Convicted,	—
James Shorton,	Harvard,	Keeping dog that chased deer,	Convicted,	20 00
Oren Kidder,	Ayer,	Keeping dog that chased deer,	Discharged,	—
Michael McNiff,	Ayer,	Keeping dog that chased deer,	Discharged,	—
James E. Worcester,	Boston,	Having in possession short trout,	Convicted,	Filed.
Ernest Shelters,	Lowell,	Seining in pond,	Convicted,	20 00
George A. Cooper,	Lowell,	Seining in pond,	Convicted,	20 00
John W. Sanger,	Lowell,	Seining in pond,	Convicted,	Filed.
George H. Moore,	Ayer,	Keeping dog that chased deer,	Discharged,	—

Augustus Peltire, . . .	Ayer, . . .	Keeping dog that chased deer, . . .	Discharged, . . .	-
Boswell Davis, . . .	Harvard, . . .	Keeping dog that chased deer, . . .	Discharged, . . .	-
James J. Merchey, . . .	Harvard, . . .	Keeping dog that chased deer, . . .	Discharged, . . .	-
C. S. Hassam, . . .	Worcester, . . .	Keeping dog that chased deer, . . .	Discharged, . . .	-
A. L. Hale, . . .	Leominster, . . .	Hunting on the Lord's day, . . .	Convicted, . . .	10 00
C. W. Burbanks, . . .	Leominster, . . .	Hunting on the Lord's day, . . .	Convicted, . . .	10 00
Frank Parmenter, . . .	Concord, . . .	Snaring, . . .	Convicted, . . .	Filed.
Frank S. Parmenter, . . .	Concord, . . .	Snaring, . . .	Convicted, . . .	Filed.
Waldo Parmenter, . . .	Concord, . . .	Snaring, . . .	Convicted, . . .	Filed.
Homor Holden, . . .	Shirley, . . .	Keeping dogs that chased deer, . . .	Convicted, . . .	20 00
Andrew Lynch, . . .	Shirley, . . .	Keeping dogs that chased deer, . . .	Convicted, . . .	20 00
Henry B. Johnson, . . .	Orange, . . .	Hunting on the Lord's day, . . .	Discharged, . . .	-
William H. Carey, . . .	Dalton, . . .	Keeping dog that chased deer, . . .	Convicted, . . .	20 00
Charles H. Scaee,† . . .	Pittsfield, . . .	Killing a deer, . . .	Discharged, . . .	-
William E. Mullett, . . .	North Adams, . . .	Hunting on the Lord's day, . . .	Convicted, . . .	5 00
Charles F. Seeley, . . .	Williamstown, . . .	Taking trout in close season, . . .	Convicted, . . .	10 00
Ray Burnham, . . .	Montague, . . .	Keeping dog that chased deer, . . .	Convicted, . . .	20 00
Leroy H. Gibbs, . . .	Pittsfield, . . .	Fishing closed pond, . . .	Convicted, . . .	2 00
Emile Gerton, . . .	Pittsfield, . . .	Illegal fishing, . . .	Convicted, . . .	20 00
Louis Marcell,§ . . .	Pittsfield, . . .	Illegal fishing, . . .	Convicted, . . .	-
Carl Bolza, . . .	Pittsfield, . . .	Illegal fishing, . . .	Convicted, . . .	2 50
Ernest Calvi,|| . . .	North Adams, . . .	Killing one robin and one song sparrow, . . .	Convicted, . . .	10 00
Paolo Deluca,¶ . . .	North Adams, . . .	Killing two robins and two cedar birds, . . .	Convicted, . . .	20 00
Frank Broadbent, . . .	Westport, . . .	Hunting on the Lord's day, . . .	Convicted, . . .	10 00

* Guilty in every case, but court showed mercy. The judge told them that if they were found taking any more shellfish illegally they would be fined at least \$50 per man.

† No fine was imposed, but the dogs were shot.

‡ Case discharged for lack of evidence.

§ Marcell was to pay one-half of Gerton's fine.

|| Fined \$10 for killing robin; charge of killing song sparrow put on file.

¶ Fined \$10 for killing one robin; charge for killing one cedar bird; charge for killing other filed.

Report upon Convictions, Fines, etc., for Violations of Fish and Game Laws — Continued.

STATE V. —	TOWN OR CITY.	Offence.	Court Decision.	Fine.
Alexander Booth, .	Fall River, .	Hunting on the Lord's day, .	Convicted, .	\$10 00
Joseph Monte, .	Fall River, .	Hunting on the Lord's day, .	Convicted, .	10 00
Chester P. Sanford, .	Westport, .	Killing a hare; hunting on the Lord's day, .	Convicted, .	20 00
Richmond A. Dexter, .	Mattapoisett, .	Hunting on the Lord's day, .	Convicted, .	5 00
Herbert W. A. Dexter, .	Mattapoisett, .	Hunting on the Lord's day, .	Convicted, .	5 00
Peter View, .	Fall River, .	Fishing closed pond, .	Discharged, .	—
Joe White, .	Fall River, .	Fishing closed pond, .	Discharged, .	—
Amedo Bureguard, .	Fall River, .	Fishing closed pond, .	Discharged, .	—
Benjamin Leppsky, .	Fall River, .	Fishing closed pond, .	Discharged, .	—
Voicher Karsolsky, .	Fall River, .	Fishing closed pond, .	Convicted, .	5 00
John Cygrike, .	Fall River, .	Fishing closed pond, .	Convicted, .	5 00
Macks Knopinski, .	Fall River, .	Fishing closed pond, .	Convicted, .	5 00
Alexander Bolge, .	Fall River, .	Fishing closed pond, .	Convicted, .	5 00
Stanislas Vester, .	Fall River, .	Fishing closed pond, .	Convicted, .	5 00
Joseph Orrus, .	Fall River, .	Fishing closed pond, .	Convicted, .	5 00
Albert Knopunsky, .	Fall River, .	Fishing closed pond, .	Convicted, .	5 00
Adam Karoski, .	Fall River, .	Fishing closed pond, .	Convicted, .	5 00
John Tenevasty, .	Fall River, .	Fishing closed pond, .	Convicted, .	5 00
Stanlaw Tenevasty, .	Fall River, .	Fishing closed pond, .	Convicted, .	5 00
Peter Cyjijiki, .	Fall River, .	Fishing closed pond, .	Convicted, .	5 00
Peter N. Maynard, .	Fall River, .	Fishing closed pond, .	Convicted, .	5 00
George Roy, .	Fall River, .	Fishing closed pond, .	Convicted, .	5 00
Alphonze J. Roy, .	Fall River, .	Fishing closed pond, .	Convicted, .	5 00
Semmy Armibella, .	Fall River, .	Fishing closed pond, .	Convicted, .	5 00
Charles Richards, .	Fall River, .	Fishing closed pond, .	Convicted, .	5 00
James Dessert, .	Fall River, .	Fishing closed pond, .	Discharged, .	—
Columbus L. Solsbee, .	Fall River, .	Fishing closed pond, .	Discharged, .	—

Ephraim Mitchell, .	Fall River, .	Fishing closed pond, .	Discharged, .	-
Fred Parsons,*	Gloucester, .	Short lobsters, .	Convicted, .	70 00
Charles D. Bacon, .	Plymouth, .	Short lobsters, .	Convicted, .	75 00
James H. Bagwell, .	Plymouth, .	Short lobsters, .	Convicted, .	18 00
Edward M. Parsons, .	Plymouth, .	Short lobsters, .	Discharged, .	-
Clarence Smith, .	Duxbury, .	Short lobsters, .	Convicted, .	165 00
Edward Gondreau, .	Fall River, .	Hunting Bristol County in close season, .	Convicted, .	10 00
Lawrence Coran,†	Fall River, .	Hunting Bristol County in close season; killing two song birds; killing gray squirrel, .	Convicted, .	30 00
Sabah Habeeb, .	Providence, R. I., .	Hunting, close season, Bristol County, .	Convicted, .	10 00
George Webby, .	Warren, R. I., .	Hunting, close season, Bristol County, .	Convicted, .	10 00
Gordon Perkins,‡	Boston, .	Hunting on the Lord's day; pursuing wild fowl with power boat, .	Convicted, .	30 00
Carlo Zarrabl,\$	Milton, .	Hunting on the Lord's day; pursuing wild fowl with power boat, .	Convicted, .	10 00
Ernest Rust,\$.	Portsmouth, N. H., .	Hunting on the Lord's day; pursuing wild fowl with power boat, .	Convicted, .	10 00
Reael F. Smiley,\$	Waltham, .	Hunting on the Lord's day; pursuing wild fowl with power boat, .	Convicted, .	10 00
John R. Glen,\$	Ipswich, .	Hunting on the Lord's day; pursuing wild fowl with power boat, .	Convicted, .	10 00
Thomas Athelley,\$	Ipswich, .	Hunting on the Lord's day; pursuing wild fowl with power boat, .	Convicted, .	10 00
Edward Letter, .	Peabody, .	Hunting on the Lord's day; pursuing wild fowl with power boat, .	Convicted, .	10 00
N. H. Pelequin, .	Northborough, .	Hunting on the Lord's day, .	Discharged, .	-
David Pecos, .	East Brookfield, .	Fishing closed pond, .	Not prosessed, .	-
		Keeping dog that chased deer, .	Convicted, .	20 00

* Appealed; fine was re-imposed in superior court.

† In this case the charge for killing gray squirrel was put on file; a fine of \$10 for hunting in close season and \$20 for killing two song birds was imposed.

‡ Fined \$10 for hunting on the Lord's day, and \$20 for pursuing wild fowl with naphtha boat.

\$ Fined \$10 for hunting on the Lord's day; charge for pursuing fowl with naphtha boat filed.

Report upon Convictions, Fines, etc., for Violations of Fish and Game Laws — Continued.

STATE V.—	TOWN OR CITY.	Offence.	Court Decision.	Fine.
Joseph Sassville,*	East Brookfield,	Keeping dog that chased deer,	Convicted,	Filed.
Joseph Akers,*	East Templeton,	Hunting on the Lord's day,	Convicted,	Filed.
Fred Bowman,	South Sudbury,	Killing a deer,	Discharged,	—
Arthur Gentis,	Mashapoung, Conn.,	Hunting on the Lord's day,	Convicted,	\$10 00
Tony Silva,	Boston,	Short lobsters,	Convicted,	45 00
E. A. Holmstead,	Dorchester,	Shooting from a launch on the Lord's day,	Convicted,	10 00
Andrew Hanson,	Cohasset,	Short and egg lobsters,	Convicted,	24 00
Frank Silver,	Boston,	Short lobsters,	Convicted,	52 00
David P. Moulton,	Chelsea,	Short lobsters,	Discharged,	—
Jerry Spencer,	Weymouth,	Hunting on the Lord's day,	Convicted,	10 00
E. A. Dailey,	Hingham,	Hunting on the Lord's day; shooting from naphtha launch,	Convicted,	30 00
Fred W. Groves,	Sterling,	Owning dog that chased deer,	Convicted,	20 00
George E. Smith,	Ware,	Fishing closed brook,	Convicted,	20 00
Larann A. Fisherdict,	Ware,	Fishing closed brook,	Convicted,	20 00
Dr. Dudley Carleton,	Springfield,	Having short trout,	Convicted,	20 00
Simon Denvirsk,	Blandford Centre,	Having short trout,	Convicted,	10 00
Anela C. Senia,	Springfield,	Shooting song birds,	Convicted,	100 00
Ben. Santina,	Springfield,	Shooting song birds,	Convicted,	10 00
Charles A. Taylor,	Rockland,	Hunting on the Lord's day,	Convicted,	10 00
Peter Aveltono,	Boston,	Short lobsters,	Convicted,	18 00
Frank Georgiano,	Boston,	Short lobsters,	Convicted,	Filed.
James Murphy,†	Hull,	Lobster car unmarked; having short lobsters,	Convicted,	285 00
Hans Slade,‡	Hull,	Short lobsters,	Convicted,	54 00
Hulver Gilliverson,§	Hull,	Short lobsters,	Convicted,	72 00
John Breggola,	Boston,	Having short lobsters,	Convicted,	10 00

Edward Cole, . . .	Braintree, . . .	Fishing closed pond, . . .	Convicted, . . .	2 00
Cameron Stewart, . . .	Braintree, . . .	Fishing closed pond, . . .	Convicted, . . .	2 00
Frank Pessotti, . . .	Milford, . . .	Taking birds in net, . . .	Convicted, . . .	20 00
Wilfred Stowell, . . .	Dartmouth, . . .	Having quail, . . .	Convicted, . . .	20 00
Lester Stowell, . . .	Dartmouth, . . .	Having quail, . . .	Convicted, . . .	20 00
Charles Gardner, . . .	Dighton, . . .	Having fish traps in Taunton River, . . .	Convicted, . . .	20 00
Mrs. Ida Motson, . . .	Padanaram, . . .	Short lobsters, . . .	Convicted, . . .	35 00
H. G. Stanbig, . . .	Ashburnham, . . .	Hunting on the Lord's day, . . .	Convicted, . . .	10 00
George Low,|| . . .	Ipswich, . . .	Killing a deer, . . .	Convicted, . . .	100 00
James Sheppard, . . .	Ipswich, . . .	Keeping a dog that chased deer, . . .	Convicted, . . .	20 00
B. C. Blanchard,|| . . .	Worcester, . . .	Illegal fishing, . . .	Convicted, . . .	20 00
E. E. Lewes,|| . . .	Worcester, . . .	Illegal fishing, . . .	Convicted, . . .	20 00
John L. Horgan,¶ . . .	Weymouth, . . .	Having illegal smelts in possession, . . .	Convicted, . . .	30 00
John O. Connell, . . .	Weymouth, . . .	Having illegal smelts in possession, . . .	Convicted, . . .	30 00
Nathaniel W. Bates, . . .	Brockton, . . .	Illegal shooting, . . .	Convicted, . . .	100 00
Angelo Cappi, . . .	Harding, . . .	Hunting on the Lord's day, . . .	Convicted, . . .	10 00
Henry Fowle, . . .	Newton, . . .	Having partridge, . . .	Convicted, . . .	40 00
Edward Fletcher,|| . . .	Holliston, . . .	Ferretting, . . .	Convicted, . . .	20 00
Antonio Ghaller, . . .	West Quincy, . . .	Fishing closed pond, . . .	Convicted, . . .	20 00
Luigi Coulteri, . . .	West Quincy, . . .	Fishing closed pond, . . .	Convicted, . . .	2 00
Wm. Padueski, . . .	New Braintree, . . .	Taking squirrels, . . .	Convicted, . . .	2 00
Joseph Casapka, . . .	New Braintree, . . .	Taking squirrels, . . .	Convicted, . . .	20 00
Frank L. Buckingham, . . .	Plymouth, . . .	Hunting in close season, . . .	Discharged, . . .	-
Walter Butter, . . .	Plymouth, . . .	Hunting in close season, . . .	Discharged, . . .	-
Pietro Gilirenti, . . .	Adams, . . .	Shooting song birds, . . .	Convicted, . . .	10 00
Ernesto Custani, . . .	Milford, . . .	Hunting on the Lord's day, . . .	Convicted, . . .	10 00
Benj. F. Hodges, . . .	Plymouth, . . .	Short lobsters, . . .	Discharged, . . .	-
John de Rodgers, . . .	Boston, . . .	Short lobsters, . . .	Convicted, . . .	10 00

* Filed on payment of costs.

† Appealed; fined in superior court \$100.

‡ Appealed; fined in superior court \$35.

§ Appealed; fined in superior court \$50.

|| Appealed.

¶ Committed to jail for non-payment.

Report upon Convictions, Fines, etc, for Violations of Fish and Game Laws — Continued.

STATE V. —	TOWN OR CITY.	Offence.	Court Decision.	Fine.
Joseph Mike, . . .	Lawrence, . . .	Shooting song birds, . . .	Convicted, . . .	\$16 00
Wm. Kowash, . . .	Lawrence, . . .	Shooting song birds, . . .	Convicted, . . .	16 00
Jim Bollet, . . .	Lawrence, . . .	Shooting song birds, . . .	Convicted, . . .	30 00
Nicola Abrico, . . .	Lawrence, . . .	Shooting song birds, . . .	Discharged, . . .	—
Pasquale Vitran, . . .	Lawrence, . . .	Shooting song birds, . . .	Discharged, . . .	—
Clarence L. Green, . . .	Sharon, . . .	Fox hunting on the Lord's day, . . .	Convicted, . . .	10 00
John T. Berry, . . .	Stoughton, . . .	Hunting on the Lord's day, . . .	Convicted, . . .	10 00
Wm. Chestnut, . . .	Stoughton, . . .	Hunting on the Lord's day, . . .	Convicted, . . .	10 00
Martin Wiley, . . .	Stoughton, . . .	Shooting squirrel; hunting on the Lord's day, . . .	Convicted, . . .	20 00
Mike Corado, . . .	Monson, . . .	Hunting on the Lord's day; having song birds; discharging firearms, . . .	Convicted, . . .	30 00
Charles A. Pipping, . . .	East Dedham, . . .	Hunting with ferret; hunting on the Lord's day, . . .	Convicted, . . .	30 00
Alberto Davis, . . .	Hingham, . . .	Shooting from naphtha dory; hunting on the Lord's day, . . .	Convicted, . . .	30 00
Augustin Rubelato,* . . .	Boston, . . .	Shooting song birds, . . .	Convicted, . . .	150 00
Hickel Pelich, . . .	Lawrence, . . .	Shooting song birds, . . .	Convicted, . . .	70 00
Ferris M. Bailey, . . .	Lawrence, . . .	Shooting song birds, . . .	Convicted, . . .	50 00
Carl Bergman, . . .	Worcester, . . .	Trawling, . . .	Convicted, . . .	20 00
Theodore Anderson, . . .	Worcester, . . .	Trawling, . . .	Convicted, . . .	30 00
C. J. Kiney, . . .	Boston, . . .	Shooting song birds, . . .	Convicted, . . .	5 00
Daniel P. Driscoll, . . .	Sherborn, . . .	Killing rabbit with ferret; hunting with ferret, . . .	Convicted, . . .	45 00
Lahotre Lococo, . . .	Northampton, . . .	Shooting robins, . . .	Convicted, . . .	10 00
Andrew Champey, . . .	North Andover, . . .	Illegal shooting, . . .	Convicted, . . .	10 00
Fred Cumbie, . . .	North Andover, . . .	Illegal shooting, . . .	Convicted, . . .	10 00
Fred Chantreal, . . .	North Andover, . . .	Illegal shooting, . . .	Convicted, . . .	10 00

Jacque Nadew,	North Andover,	Illegal fishing,	.	.	.	Convicted,	20 00
Alphonso Collfrath,	North Andover,	Illegal fishing,	.	.	.	Convicted,	20 00
Napoleon Johnndrow,	North Adams,	Fishing on the Lord's day; having short trout,	.	.	.	Convicted,	15 00
Peter Mains,	Quincy,	Shooting song birds,	.	.	.	Convicted,	30 00
Louis Barrie,	Medfield,	Shooting song birds,	.	.	.	Convicted,	20 00
John Gatto,	Beverly,	Shooting song birds,	.	.	.	Convicted,	60 00
Frank Morale,	.	Shooting song birds,	.	.	.	Discharged,	-
John Decesure,	Lawrence,	Shooting deer,	.	.	.	Discharged,	-
Raffael Dellino,	Lexington,	Discharging firearms; hunting on the Lord's day,	.	.	.	Convicted for discharging firearms; discharged for Sunday hunting,	2 00
Genitti Carmine,	Lexington,	Discharging firearms; hunting on the Lord's day,	.	.	.	Convicted for discharging firearms; discharged for Sunday hunting,	2 00
John McDevitt,†	Woburn,	Shooting song birds,	.	.	.	Convicted,	2 00
E. E. Day,‡	Pittsfield,	Killing a pheasant,	.	.	.	Convicted,	Filed.
J. J. Noran,†	Pittsfield,	Killing a pheasant,	.	.	.	Convicted,	23 50
Edward J. Malley,†	Pittsfield,	Killing a pheasant,	.	.	.	Convicted,	23 50
Placido Grangie,	Lawrence,	Killing song birds,	.	.	.	Convicted,	26 40
Emil Roth,	Greenfield,	Hunting with ferret; hunting on the Lord's day,	.	.	.	Convicted,	30 00
			.	.	.	Convicted,	20 00

* When arrested, Rubelato had in his possession twelve robins, two thrushes, one cuckoo, one bluejay, one shore bird, four gray squirrels, one red squirrel and birds not protected by law. The case was appealed; in the superior court the verdict of the lower court was sustained. Since the defendant could not pay the fine, he was sentenced to three months in jail; this, together with the time already served, made five months.

† A boy; the case was placed on file.

‡ Appealed.

Report upon Convictions, Fines, etc., for Violations of Fish and Game Laws — Concluded.

STATE v. —	TOWN OR CITY.	Offence.	Court Decision.	Fine.
Mike Watson, .	Athol, .	Hunting on the Lord's day, .	Convicted, .	\$10 00
E. Johnson, .	Worcester, .	Hunting on the Lord's day, .	Convicted, .	10 00
D. Loan, .	Worcester, .	Fishing through the ice with set nets, .	Convicted, .	10 00
G. Donnell, .	Worcester, .	Fishing through the ice with set nets, .	Convicted, .	10 00
J. L. Sturtevant, .	Quincy, .	Hunting on the Lord's day, .	Convicted, .	10 00
Horatio J. Amos, .	South Mashpee, .	Hunting on the Lord's day, .	Convicted, .	10 00
Austin H. Pochnet, .	South Mashpee, .	Hunting on the Lord's day, .	Convicted, .	10 00
Robert M. Johnson, .	Sharon, .	Shooting a pheasant, .	Convicted, .	20 00
Edgar L. Freeman, .	Medway, .	Fishing closed pond, .	Convicted, .	20 00
Clyde C. Hunt, .	Medway, .	Fishing closed pond, .	Convicted, .	20 00
J. F. Donan, .	Natick, .	Killing gray squirrel; hunting on the Lord's day, .	Convicted, .	30 00

[F.]

LEGISLATION.

Acts of 1904.

[CHAPTER 116.]

AN ACT TO AUTHORIZE THE TAKING OF SHINERS FOR BAIT IN THE
CONNECTICUT RIVER DURING CERTAIN MONTHS.

Be it enacted, etc., as follows :

SECTION 1. Section eighty-one of chapter ninety-one of the Revised Laws is hereby amended by striking out the word "river", in the third line, and inserting in place thereof the words :— and Connecticut rivers, — so as to read as follows :— *Section 81.* During November and December any person may, for the purpose of taking shiners for bait, draw a net or seine at any point in the Merrimac and Connecticut rivers except within four hundred yards of any fishway ; and if any other fish so caught are immediately returned alive to the waters from which they were taken, the penalties prescribed in sections forty-six, forty-seven, forty-nine, seventy-eight and seventy-nine shall not apply to the taking of such fish.

SECTION 2. This act shall take effect upon its passage. [*Approved February 27, 1904.*]

[CHAPTER 118.]

AN ACT RELATIVE TO FISHERIES IN THE WATERS OF PLEASANT BAY
AND ITS TRIBUTARIES IN THE TOWN OF ORLEANS.

Be it enacted, etc., as follows :

SECTION 1. No purse or sweep seines, set nets or gill nets, for the taking of fish shall be set, drawn, used or maintained in the waters of Pleasant bay or its tributaries in the town of Orleans ; but nothing herein contained shall be construed to forbid or make unlawful the maintaining of traps, pounds or weirs under licenses granted in accordance with section one hundred and sixteen of chapter ninety-one of the Revised Laws.

SECTION 2. Any person who shall set, draw, use or maintain a purse or sweep seine, set net or gill net in violation of this act shall be punished by a fine of not less than one hundred nor more than five

hundred dollars, or by imprisonment for a term not exceeding six months.

SECTION 3. Chapter one hundred and sixty-three of the acts of the year nineteen hundred and one is hereby repealed.

SECTION 4. This act shall take effect upon its passage. [*Approved February 27, 1904.*]

[CHAPTER 132.]

AN ACT TO AUTHORIZE THE ARREST WITHOUT WARRANT OF PERSONS
UNLAWFULLY FISHING IN PALMER'S RIVER.

Be it enacted, etc., as follows :

SECTION 1. The sheriff of the county of Bristol or any of his deputies, or any constable or fish warden of either of the towns of Swansea and Rehoboth, may without a warrant arrest any person whom he finds in the act of taking herring, alewives or shad from the waters of Palmer's river in either of said towns in violation of the provisions of chapter one hundred and thirty of the acts of the year eighteen hundred and thirty-six, or of chapter ninety-two of the acts of the year eighteen hundred and fifty-two, and may detain such person in a place of safe keeping until a warrant can be procured upon a complaint against him for said offence : *provided*, that the detention without a warrant shall not exceed twenty-four hours.

SECTION 2. Whoever violates the provisions of either of said chapters shall, in addition to the forfeitures therein provided, forfeit the seines or nets used in such unlawful taking of herring, alewives or shad. [*Approved March 5, 1904.*]

[CHAPTER 176.]

AN ACT TO PROVIDE FOR BETTER PROTECTION OF BIRDS AND WILD
ANIMALS ON THE LORD'S DAY.

Be it enacted, etc., as follows :

Section one of chapter ninety-two of the Revised Laws is hereby amended by inserting after the word "birds", in the second line, the words :—wild animals,—and by striking out all after the words "liable to", in the third line, and inserting in place thereof the words :—a penalty of not less than ten nor more than twenty dollars in addition to any penalties for taking, killing or having in possession birds, wild animals or game protected by law,—so as to read as follows :—*Section 1.* The Lord's day shall be close season. Whoever hunts or destroys birds, wild animals or game of any kind on the Lord's day shall be liable to a penalty of not less than ten nor

more than twenty dollars in addition to any penalties for taking, killing or having in possession birds, wild animals or game protected by law. [*Approved March 22, 1904.*]

[CHAPTER 223.]

AN ACT RELATIVE TO THE TAKING OF BLACK BASS.

Be it enacted, etc., as follows :

SECTION 1. Section sixty-nine of chapter ninety-one of the Revised Laws, relative to the taking of black bass, is hereby repealed.

SECTION 2. This act shall take effect upon its passage. [*Approved April 9, 1904.*]

[CHAPTER 232.]

AN ACT TO PERMIT THE TAKING OF ALEWIVES OR HERRING IN HUMMOCK POND IN THE ISLAND OF NANTUCKET.

Be it enacted, etc., as follows :

SECTION 1. The inhabitants of the island of Nantucket may take alewives or herring with seines or nets in Hummock pond, south of the bridge in the said island, from the tenth day of March to the thirty-first day of May, inclusive, in each year; but all fish, other than alewives or herring, caught or taken in such seines or nets shall immediately be put back in the water whence they were taken.

SECTION 2. Any person violating the provisions of this act, by failing to put back immediately as aforesaid fish other than alewives or herring caught or taken as aforesaid, shall be punished by a fine of not less than twenty nor more than fifty dollars.

SECTION 3. So much of section twenty-six of chapter ninety-one of the Revised Laws as is inconsistent herewith is hereby repealed.

SECTION 4. This act shall take effect upon its passage. [*Approved April 13, 1904.*]

[CHAPTER 269.]

AN ACT TO PROVIDE FOR THE PROTECTION AND CULTIVATION OF QUahaugs IN THE TOWNS OF EASTHAM, ORLEANS AND WELLFLEET.

Be it enacted, etc., as follows :

SECTION 1. No person shall take quahaugs from their natural beds, or wilfully obstruct or interfere with such natural beds, within the towns of Eastham, Orleans and Wellfleet, except as hereinafter provided.

SECTION 2. No inhabitant of said towns shall sell or offer for sale little neck clams or quahaugs which measure less than one and one

half inches across the widest part, and no person shall in any of said towns sell or offer for sale little neck clams or quahaugs which measure less than one and one half inches across the widest part.

SECTION 3. The selectmen of any one of said towns may give to any inhabitants of any of said towns permits in writing to take quahaugs from their beds in the town which the selectmen represent, at such times, in such quantities and for such uses as they shall deem expedient. Such permits shall be good for such time as the selectmen may determine, not exceeding one year. Any inhabitant of the Commonwealth may without such permit take from the natural beds in said towns quahaugs for the use of his family, not exceeding in quantity one bushel, including shells, in any one day; and any fisherman may without such permit take quahaugs from the natural beds in his own town for bait for his own use, not exceeding in quantity one bushel, including shells, in any one day.

SECTION 4. The selectmen of the said towns may, in their respective towns, grant licenses or permits for such periods, not exceeding two years, and under such conditions as they may deem proper, not however covering more than seventy-five feet square in area, to any inhabitants of the town to bed quahaugs in any waters, flats and creeks within the town at any place where there is no natural quahaug bed, not impairing the private rights of any person or materially obstructing any navigable waters. It shall be unlawful for any person, except the licensee and his agents, to take any quahaugs in or remove them from the territory covered by any such license.

SECTION 5. Whoever violates any provision of this act or of any regulation made by the selectmen under authority hereof shall be punished by a fine of not more than one hundred dollars or by imprisonment for not more than six months, or by both such fine and imprisonment.

SECTION 6. So much of section eighty-five of chapter ninety-one of the Revised Laws as is inconsistent herewith shall not apply to the said towns.

SECTION 7. This act shall take effect in any of said towns only upon its acceptance by a majority of the voters thereof present and voting thereon at a meeting called for the purpose. [*Approved April 28, 1904.*]

[CHAPTER 282.]

AN ACT RELATIVE TO THE PROPAGATION AND CULTIVATION OF
SHELLFISH.

Be it enacted, etc., as follows:

SECTION 1. Cities by a two thirds vote of each branch of the city council in cities having a common council and a board of aldermen,

or by a two thirds vote of the board of aldermen in cities not having a common council, and towns by a two thirds vote of the voters present and voting thereon at any town meeting called for the purpose, may appropriate money for the cultivation, propagation and protection of shellfish. The mayor and aldermen of cities, and the selectmen of towns, when so authorized by their respective cities and towns, may declare from time to time a close season for shellfish for not more than three years in such waters or flats within the limits of their respective cities and towns as they deem proper, and may plant and grow shellfish in such waters and flats: *provided*, that no private rights are impaired; and *provided, further*, that when any close season, declared as aforesaid, shall have ended, the flats and waters so closed shall be opened subject to the provisions of section eighty-five of chapter ninety-one of the Revised Laws, and of any special laws.

SECTION 2. Whoever takes shellfish in violation of the provisions of this act shall forfeit not less than three nor more than fifty dollars. Any officer qualified to serve criminal process, and special constables, designated under the provisions of section one hundred and thirty-four of chapter ninety-one of the Revised Laws, shall have power to enforce the provisions of this act, with all the powers conferred by said section.

SECTION 3. District courts and trial justices shall have concurrent jurisdiction with the superior court of all offences under this act.

SECTION 4. This act shall take effect upon its passage. [*Approved April 30, 1904.*]

[CHAPTER 301.]

AN ACT TO PERMIT THE TAKING OF BAIT IN THE WATERS OF THE
TOWN OF EDGARTOWN.

Be it enacted, etc., as follows:

SECTION 1. The selectmen of the town of Edgartown, or any two of them, may issue to any inhabitant of said town holding a permit for the taking of eels by means of pots, permits for the taking of bait for his own use only from the waters of said town by means of nets or seines. Such permits shall not be issued for the use of nets or seines more than one hundred and fifty feet long, or of a size of mesh of more than three fourths of an inch, and shall be issued for the taking of such bait only between the first day of June and the fifteenth day of December in each year. The provisions of this act shall not affect the rights of the persons designated in section twenty-three of chapter ninety-one of the Revised Laws, or the corporate rights of any fishing company.

SECTION 2. So much of section one hundred and twenty-seven of

chapter ninety-one of the Revised Laws and of any other act as is inconsistent herewith is hereby repealed.

SECTION 3. This act shall take effect upon its passage. [*Approved May 6, 1904.*]

[CHAPTER 308.]

AN ACT TO PROVIDE FURTHER FOR THE PROTECTION OF FISH IN
PONDS.

Be it enacted, etc., as follows :

Section twenty-six of chapter ninety-one of the Revised Laws, as amended by chapter two hundred and ninety-four of the acts of the year nineteen hundred and three, is hereby further amended by striking out the whole of said section and inserting in place thereof the following : — *Section 26.* Whoever draws, sets, stretches or uses a drag net, set net, purse net, seine or trawl, or whoever sets or uses more than ten hooks for fishing, in any pond, or aids in so doing, shall be punished by a fine of not less than twenty nor more than fifty dollars. The provisions of this section shall not affect the rights of riparian proprietors of ponds mentioned in section twenty-three or the corporate rights of any fishing company. [*Approved May 6, 1904.*]

[CHAPTER 319.]

AN ACT TO PROVIDE FOR THE ELECTION OF FISH WARDENS BY THE
TOWN OF EDGARTOWN.

Be it enacted, etc., as follows :

SECTION 1. The town of Edgartown is hereby authorized to choose at any annual town meeting, or at any meeting duly called for the purpose, fish wardens, in such number and with such compensation as the town may determine, who shall be sworn to the faithful discharge of their duty, which shall be to enforce the fishery laws in that town; and for this purpose the fish wardens so chosen shall have the powers which the district police now have or shall hereafter have for the enforcement of the fishery laws of the Commonwealth.

SECTION 2. This act shall take effect upon its passage. [*Approved May 9, 1904.*]

[CHAPTER 321.]

AN ACT FURTHER TO PROTECT AND PERPETUATE A CERTAIN ALEWIFE
FISHERY IN THE TOWN OF SANDWICH.

Be it enacted, etc., as follows :

SECTION 1. Levi S. Nye and John A. Holway, their heirs and assigns, shall have for the term of ten years from the date of the

passage of this act, the exclusive right to take and catch alewives in the stream known as “ Mill River ”, from its sources in the “ Shawnee Lakes or Ponds ”, so-called, through the marshes in the town of Sandwich to the waters of Cape Cod bay: *provided*, that the said Nye and Holway, their heirs and assigns, shall construct and maintain a good and sufficient passageway over or around the dam or dams which now are or may hereafter be erected upon said stream to enable fish to enter the ponds above such dam or dams, and shall keep such passageway open and unobstructed from the first day of April to the fourteenth day of June, inclusive, of each year.

SECTION 2. Said Nye and Holway, and their heirs and assigns, may catch alewives during two thirds of the period specified in section one, that is to say, upon fifty days out of the seventy-five days between the first day of April and the fourteenth day of June, inclusive, of each year.

SECTION 3. Any person or persons taking alewives in said Mill river or in the said lakes or ponds without the written consent of the said Nye and Holway, or of their heirs and assigns, shall, upon the complaint of said Nye or Holway, or of their or any of their heirs or assigns, or of any person in their behalf, forfeit not less than ten nor more than twenty dollars for each offence. Half of every such forfeiture shall be paid to said Nye and Holway or to their heirs or assigns. [*Approved May 9, 1904.*]

[CHAPTER 329.]

AN ACT TO PROVIDE FURTHER FOR THE PROTECTION OF PICKEREL.
Be it enacted, etc., as follows :

Section sixty-seven of chapter ninety-one of the Revised Laws is hereby amended by striking out the words “ the county of Berkshire ”, in the first and second lines, and inserting in place thereof the words : — this Commonwealth, — by striking out the words “ in said county ”, in the third line, and by inserting after the word “ taken ”, in the fifth line, the words : — held in possession, — so as to read as follows : — *Section 67.* Whoever takes from the waters of this Commonwealth a pickerel less than ten inches in length, or sells or offers for sale, or has in his possession with intent to sell any such pickerel, shall forfeit one dollar for each pickerel so taken, held in possession, sold or offered or exposed for sale; and in prosecutions under the provisions of this section the possession of pickerel less than ten inches in length shall be prima facie evidence to convict. [*Approved May 13, 1904.*]

[CHAPTER 364.]

AN ACT TO REQUIRE TOWN CLERKS TO NOTIFY THE BOARD OF COMMISSIONERS ON FISHERIES AND GAME OF THE ACCEPTANCE OF CERTAIN PROVISIONS OF LAW RELATIVE TO THE TAKING OF PICKEREL.

Be it enacted, etc., as follows :

It shall be the duty of the town clerk of any town which has accepted, or which shall hereafter accept, the provisions of section sixty-eight of chapter ninety-one of the Revised Laws, which restricts the taking of pickerel to the use of a hook and hand line, to send notice of such acceptance to the commissioners on fisheries and game. Such notice shall be sent within thirty days after any future acceptance of the said provisions by any town, and within sixty days after the passage of this act in the case of every town which has heretofore accepted said provisions. A town clerk who violates the provisions of this act shall be subject to a fine of ten dollars. [Approved May 23, 1904.]

[CHAPTER 365.]

AN ACT RELATIVE TO THE BUILDING OF FISHWAYS BY THE BOARD OF COMMISSIONERS ON FISHERIES AND GAME.

Be it enacted, etc., as follows :

Section nine of chapter ninety-one of the Revised Laws is hereby amended by inserting after the word "maintained", in the second line, the words :— or where in their judgment fishways are needed, and they, — by inserting after the word "rivers", in the fourth line, the words :— or whether in their judgment a fishway is needed for the passage of fish over any dam, — and by inserting after the word "therein", in the sixth line, the words :— and where, how and when a new fishway must be built, — so as to read as follows :— *Section 9.* The commissioners may examine all dams upon rivers where the law requires fishways to be maintained, or where in their judgment fishways are needed, and they shall determine whether the fishways, if any, are suitable and sufficient for the passage of the fish in such rivers, or whether in their judgment a fishway is needed for the passage of fish over any dam ; and shall prescribe by an order in writing what changes and repairs, if any, shall be made therein, and where, how and when a new fishway must be built, and at what times the same shall be kept open, and shall give notice to the owners of the dams accordingly. The supreme judicial court, or the superior court, shall, upon the petition of the commissioners, have jurisdiction in equity or otherwise to enforce any order made in accordance with the provisions of this section, and to restrain any violation of such order. [Approved May 23, 1904.]

[CHAPTER 366.]

AN ACT TO PROVIDE FOR THE BETTER PROTECTION OF GAME IN THE
COUNTY OF BRISTOL.

Be it enacted, etc., as follows :

SECTION 1. Whoever in the county of Bristol hunts, takes or kills a gray squirrel between the fifteenth day of December and the first day of November following, or a rabbit or hare between the first day of March and the first day of November of any year, shall be punished by a fine of ten dollars.

SECTION 2. Whoever in the county of Bristol hunts, takes, kills or has in possession, or buys, sells or offers for sale a quail, woodcock, or ruffed grouse, commonly called partridge, between the fifteenth day of December and the first day of November following, whenever or wherever such bird may have been taken or killed, shall be punished by a fine of twenty dollars for each bird.

SECTION 3. This act shall not be construed as modifying the provisions of section three of chapter ninety-two of the Revised Laws, as amended by chapter one hundred and sixty-five of the acts of the year nineteen hundred and two, relative to the sale of quail, nor as modifying the provisions of section nine of chapter ninety-two of the Revised Laws, relative to the sale of rabbits.

SECTION 4. All acts and parts of acts inconsistent herewith are hereby repealed. [*Approved May 23, 1904.*]

[CHAPTER 367.]

AN ACT RELATIVE TO THE RIGHT OF SEARCH BY THE COMMISSIONERS ON
FISHERIES AND GAME AND THEIR DEPUTIES.

Be it enacted, etc., as follows :

SECTION 1. Any commissioner on fisheries and game, deputy commissioner on fisheries and game, member of the district police, or officer qualified to serve criminal process, may, with a warrant, search any boat, car, box, locker, crate or package, and any building, where he has reason to believe any game or fish taken or held in violation of law is to be found, and may seize any game or fish so taken or held, and any game or fish so taken or held shall be forfeited: *provided, however*, that this section shall not authorize entering a dwelling house, or apply to game or fish which is passing through this Commonwealth under authority of the laws of the United States.

SECTION 2. A court or justice authorized to issue warrants in criminal cases shall, upon complaint under oath that the complainant believes that any game or fish unlawfully taken or held is concealed in a particular place, other than a dwelling house, if satisfied that

there is reasonable cause for such belief, issue a warrant to search therefor. The search warrant shall designate and describe the place to be searched and the articles for which search is to be made, and shall be directed to any officer named in section one of this act, commanding him to search the place where the game or fish for which he is required to search is believed to be concealed, and to seize such game or fish.

SECTION 3. This act shall take effect upon its passage. [*Approved May 23, 1904.*]

[CHAPTER 369.]

AN ACT TO PROVIDE FURTHER FOR THE PROTECTION OF SHORE, MARSH
AND BEACH BIRDS.

Be it enacted, etc., as follows :

Chapter ninety-two of the Revised Laws is hereby amended by striking out section six and inserting in place thereof the following : — *Section 6.* Whoever buys, sells, exposes for sale, or has in possession any of the birds named in and protected by section five or section seven of this chapter, during the time within which the taking or killing thereof is prohibited, whenever or wherever such birds may have been taken or killed, shall be punished by a fine of ten dollars for each bird ; but a person, firm or corporation dealing in game or engaged in the cold storage business may have in possession, for storage purposes only, the so-called shore, marsh and beach birds during the time within which the taking or killing of them is prohibited. [*Approved May 23, 1904.*]

[CHAPTER 408.]

AN ACT TO PROVIDE FOR THE PROTECTION OF LOBSTERS WITH EGGS
ATTACHED.

Be it enacted, etc., as follows :

SECTION 1. The commissioners on fisheries and game are hereby authorized and empowered to purchase, at a rate not exceeding twenty-five per cent above the market price, lobsters with eggs attached, caught along the shore of this Commonwealth. Whoever catches any such lobsters with eggs attached may, after receiving a permit from the commissioners on fisheries and game, safely store the same in lobster cars or sections of cars used for that purpose only, and may keep them separate from other lobsters until such time as the said commissioners or some person or persons designated by them can gather and pay for them. The commissioners and their agent shall liberate them in the vicinity of the location where they

were caught; or they may at their discretion sell any portion or all of them to the officer in charge of the United States fish hatchery for artificial propagation, the proceeds to be applied to the appropriation made for the enforcement of this act.

SECTION 2. The sum of three thousand dollars, or so much thereof as may be necessary, may be expended at the discretion of the commissioners for carrying out the provisions of this act in the year nineteen hundred and four, and the sum of four thousand dollars, or so much thereof as may be necessary, in the year nineteen hundred and five.

SECTION 3. For purchasing, equipping and maintaining a suitable boat to be used by the said commissioners in enforcing the provisions of this act, a sum not exceeding four thousand dollars may be expended.

SECTION 4. This act shall take effect upon its passage. [*Approved June 3, 1904.*]

[G.]
STATISTICS.

The following tables show the statistics of the shore net and lobster fisheries of Massachusetts as reported to this commission for the year ending Oct. 1, 1904.

The statistics are divided into three tables, specifying the number of men employed, the number and value of boats, pound and trap nets, seines, gill nets and fyke nets, lobster pots and shore property; also, the number in pounds and value of the different species of fish. As compared with the year 1903, there is a falling off of 134 men, principally in Essex, Barnstable and Dukes counties. The number of boats, pounds, seines, gill nets and lobster pots show a slight falling off, with a total decrease in values, including shore property, of \$1,708.60; and the total of 19,045,492 pounds of the different species of fish shows an increase over 1903 of 1,180,283 pounds, with a decrease in value of \$2,550.04.

TABLE NO. 1.— *Showing, by Counties, the Number of Men employed in the Shore Net and Lobster Fisheries of Massachusetts in 1904.*

COUNTIES.	Number.	COUNTIES.	Number.
Essex,	126	Nantucket,	41
Suffolk,	43	Dukes,	82
Norfolk,	28	Bristol,	70
Plymouth,	110	Total,	804
Barnstable,	304		

TABLE NO. 2. — *Showing, by Counties, the Apparatus employed in the Shore Net and Lobster Fisheries of Massachusetts in 1904.*

DESIGNATION.	ESSEX.		SUFFOLK.		NORFOLK.	
	Number.	Value.	Number.	Value.	Number.	Value.
Boats,	136	\$14,142 00	64	\$6,145 00	35	\$6,918 00
Pound nets and trap nets, .	15	6,460 00	2	3,000 00	-	-
Seines, gill nets and fyke nets,	172	3,945 00	-	-	5	70 00
Lobster pots,	4,093	4,277 25	4,036	4,239 75	2,815	3,960 00
Shore property and accessory apparatus,	-	3,013 90	-	1,002 00	-	436 00
Totals,	-	\$31,838 15	-	\$14,386 75	-	\$11,384 00

DESIGNATION.	PLYMOUTH.		BARNSTABLE.		NANTUCKET.	
	Number.	Value.	Number.	Value.	Number.	Value.
Boats,	173	\$13,011 00	286	\$14,628 00	44	\$7,989 00
Pound nets and trap nets, .	1	1,600 00	97	73,160 00	3	3,000 00
Seines, gill nets and fyke nets,	29	308 00	1,285	13,636 00	304	4,417 00
Lobster pots,	5,723	8,505 50	1,582	1,462 50	335	287 00
Shore property and accessory apparatus,	-	1,871 00	-	12,748 95	-	1,567 00
Totals,	-	\$25,295 50	-	\$147,635 45	-	\$17,260 00

DESIGNATION.	DUKES.		BRISTOL.		TOTALS.	
	Number.	Value.	Number.	Value.	Number.	Value.
Boats,	105	\$11,802 00	26	\$1,342 00	869	\$107,977 00
Pound nets and trap nets, .	43	18,925 00	-	-	161	106,145 00
Seines, gill nets and fyke nets,	88	635 00	14	1,390 00	1,897	24,401 00
Lobster pots,	800	766 00	155	150 00	19,589	23,648 00
Shore property and accessory apparatus,	-	1,307 00	-	1,703 00	-	23,648 85
Totals,	-	\$33,435 00	-	\$4,585 00	-	\$285,819 85

TABLE NO. 3.—*Showing, by Counties and Species, the Yield of the Shore Net and Lobster Fisheries of Massachusetts in 1904.*

SPECIES.	ESSEX.		SUFFOLK.		NORFOLK.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Alewives,	65,850	\$843 00	-	-	-	-
Bluefish,	-	-	-	-	-	-
Flounders and flatfish, .	3,050	91 50	-	-	-	-
Mackerel,	47,456	2,355 16	150	\$12 07	-	-
Menhaden,	532,455	1,940 20	14,860	107 10	-	-
Pollock,	136,608	923 93	12,703	112 48	-	-
Salmon,	13	2 75	-	-	-	-
Scup,	670	42 77	-	-	-	-
Sea bass,	-	-	-	-	-	-
Sea herring,	437,580	4,288 15	20,500	204 89	10,300	\$103 00
Shad,	9,517	110 17	-	-	-	-
Squeteague,	18,738	235 90	-	-	-	-
Striped bass,	-	-	-	-	-	-
Squid,	2,542	29 26	-	-	-	-
Tautog,	85	2 50	-	-	-	-
Other edible or bait species,	823,326	6,786 95	176,746	883 73	-	-
Refuse fish,	-	-	-	-	-	-
Oil,	-	-	-	-	-	-
Lobsters,	198,439	24,895 14	131,661	16,465 19	131,256	16,073 01
Totals,	2,276,329	\$42,547 38	356,620	\$17,785 46	141,556	\$16,176 01

SPECIES.	PLYMOUTH.		BARNSTABLE.		NANTUCKET.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Alewives,	150,000	\$900 00	352,301	\$3,828 79	10,470	\$128 20
Bluefish,	-	-	10,193	811 43	50,029	3,305 77
Flounders and flatfish, .	-	-	1,135,014	21,199 72	2,300	69 00
Mackerel,	3,115	230 75	586,825	39,519 52	79,700	2,290 00
Menhaden,	11,902	300 07	223,053	1,328 70	-	-
Pollock,	1,500	30 00	1,877,804	24,657 75	200,320	3,656 46
Salmon,	-	-	-	-	-	-
Scup,	-	-	20,198	347 90	26,404	1,592 12
Sea bass,	-	-	65	10 50	1,800	270 00
Sea herring,	5,000	50 00	1,410,743	11,215 59	-	-
Shad,	76	3 80	6,062	290 20	720	72 00
Squeteague,	30	2 40	1,621,112	23,722 10	84,343	2,489 69
Striped bass,	-	-	8,707	1,137 41	137	21 98
Squid,	-	-	789,947	7,627 89	500	5 00
Tautog,	-	-	10,804	208 19	26	78
Other edible or bait species,	34,100	110 00	4,217,541	25,713 65	81,981	3,194 73
Refuse fish,	-	-	-	-	1,800	2 75
Oil,	-	-	5,200	311 25	-	-
Lobsters,	288,960	32,071 48	44,951	8,120 09	8,424	1,130 65
Totals,	494,683	\$33,698 50	12,320,520	\$170,050 68	548,954	\$18,229 13

TABLE NO. 3.—*Yield of the Shore Net and Lobster Fisheries—Concluded.*

SPECIES.	DUKES.		BRISTOL.		TOTAL FOR STATE.	
	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.
Alewives,	104,150	\$565 61	446,150	\$3,282 50	1,128,921	\$9,548 10
Bluefish,	331	33 30	-	-	60,553	4,050 50
Flounders and flatfish, .	116,279	1,390 00	-	-	1,256,643	22,750 22
Mackerel,	37,208	2,570 88	-	-	754,454	46,978 38
Menhaden,	1,000	2 50	70,000	750 00	853,270	4,428 57
Pollock,	9,965	160 30	-	-	2,238,900	29,540 92
Salmon,	3	60	-	-	16	3 35
Scup,	584,595	12,356 20	-	-	631,867	14,338 99
Sea bass,	19,925	1,145 19	-	-	21,790	1,425 69
Sea herring,	-	-	-	-	1,884,123	15,861 63
Shad,	930	56 55	55,196	2,518 55	72,501	3,051 27
Squeteague,	1,292,063	37,912 20	1,500	57 00	3,017,786	64,419 29
Striped bass,	-	-	-	-	8,844	1,159 39
Squid,	20,850	316 26	-	-	813,839	7,973 41
Tautog,	4,513	101 03	-	-	15,428	312 50
Other edible or bait species,	101,428	2,331 82	-	-	5,435,122	39,020 88
Refuse fish,	16,000	7 50	-	-	17,800	10 25
Oil,	-	-	-	-	5,200	311 25
Lobsters,	21,279	3,072 37	3,465	526 60	828,435	102,354 53
Totals,	2,330,519	\$62,022 31	576,311	\$7,134 65	19,045,492	\$367,544 12

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